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Investigation of Various Cement Productions and Its Characterization

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Abstract. Concrete Alumina, silica, lime, iron oxide and A powder of magnesium oxide Burned together in a kiln Used as a fine powder a uncooked fabric for mortar and urban: any compound is used for the identical motive. A binding element or object and many others. Water is the primary element When it is mixed with cement Connecting the whole together Creating a paste. Water hardens concrete thru a procedure known as hydration. Cement is a binder used in production to bond, harden and glue other substances together. Cement is rarely used alone, but to bond sand and gravel cement technology, Kothanar Supply Inc. is a privately owned company that supplies hydraulic cement and patch mixtures to businesses throughout North America, including the United States. It is not widely used in cement construction in Canada and Puerto Rico because it has higher thermal hydration than concrete, cement is less durable than concrete and is prone to cracking. It is difficult to cure and thus does not apply to areas that are easily affected by movement. Today, the most important investments in our country's Infrastructure, transportation, culture and improvement are built with cement and concrete. Infrastructure initiatives such as the Hoover Dam and the Los Angeles Aqueduct helped shape West America, the building block of most bridges, roads, dams, and structures, releasing large amounts of CO2 into concrete each year. The cement industry, the most consumed material on earth besides water, Is the 0.33 largest business source of pollutants, emitting in step with . Against the backdrop of a growing population, per capita consumption represents a dramatic decline. Any use of non-renewable resources is essentially unsustainable. Uses fossil fuels, bulk sand and gravel to make concrete and cement
Keywords: Cement, Alumino phosphate cement, Zinc oxide phosphate cement, Calcium sulfoaluminate cement, Magnesium phosphate cement, Acrylic bone cement.

1. Introduction

Aluminum phosphate is a chemical compound. In nature it occurs as the Berlinite mineral. Many synthetic forms of aluminum phosphate are known. They have a zeolite-like structure and are used as catalysts, ion-exchangers or molecular sieves. Aluminum phosphate gel is commercially available. It consists of alumina phosphate cement, which has its own cementitious phases with high hydration performance, and zinc phosphate cement is formed here by the sol-gel process. A temporary restoration. Zinc Phosphate Cement The oldest and most widespread One of the cements used is, And it is commonly used permanently. steel recuperation and basis. It is a excessive energy cement base combined with. Zinc oxide cements are a mixture of zinc oxide and eugenol. They are mainly used as a lining or base under amalgam restorations and as temporary lamps or fillers. Purpose: Calcium phosphate cement is a biodegradable and biodegradable adhesive in powder and liquid form that, when mixed primarily with hydroxyapatite, is sometimes mixed with non-reactive particles and other phases.

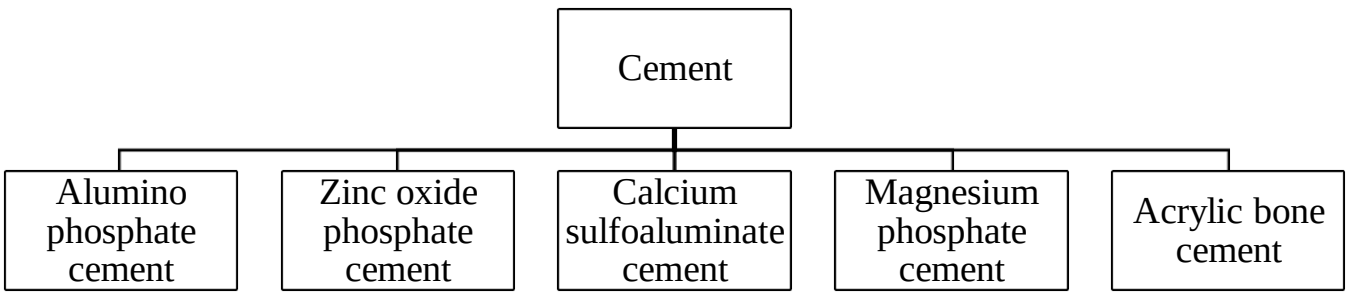

FIGURE 1. Types of Cement

Zinc phosphate is used to make corrosion-resistant coatings, which are generally Electroplating As part of the process Or primary Used as a pigment. It reacts reasonably with water and is acid soluble with zinc assets, bearing in mind good moisture resistance and galvanic substitution houses. Calcium-aluminate cements are primarily used for high heat dissipation applications. Other applications include moderate acid-resistance applications, high initial-strength and rapid-forming compounds, and part expansion properties in some compression-compensating cements. The first method is fusion, which involves liquefying the raw material of bauxite and limestone in an echo furnace. In the second method, high-purity limestone and high-purity alumina are bonded together in a rotating furnace. Buzzi Unicem USA CSA Cement is a cementation powder that increases strength, reduces set time, increases durability and reduces shrinkage of standard concrete mix designs.

2. Cement

The cement sub-sector uses about 12-15% of the entire industrial electricity use. Therefore, this subdivision emits CO2 emissions into the surroundings due to burning fossil fuels to supply the electricity required for the cement manufacturing manner. The cement enterprise contributes 7% of global CO2 emissions. It bills for nearly 6% of the world's cement industry, which comes especially from the of fossil fuels Combustion and calcification Calcium in stone Limestone as chloride. The indirect amount of CO2 comes from the electricity consumption generated by the combustion of fossil fuels.[245] In concrete mix Cement in and Water cement paste Referred to as. In composite, vehicles range from concrete in that they incorporate handiest the best compounds and plasticizing agents in hydraulic cement. Cement Production, Part I Major environmental issues of mining of cement uncooked substances had been discussed. The relaxation of the environmental challenges and possibilities associated with clinker and cement production are the issue of this newsletter. Cement production is discussed, firstly Problems 2 and secondly Advantages. [246] Cement should be determined in the calculation of the constitution and the existing amount should be taken into account. If this is not done, a bug that is usually small but uncertain can be introduced, which is made of quartz, titanium and many other materials. The amount of residue is usually very small, about 0.2 percent. Cement following the burning process. In calculating the constitution, this value is set without further change [247] using its life cycle impact estimate, which varies between cement production and different cement plants. As the cement production enterprise is beneath intense scrutiny today because of the high CO2 emissions calculated using environmental impacts, the details of the cement manufacturing methods are explored to expose the applicable location of raw material production and clinker manufacturing for that reason. . In reality, the industry is expected to apply LCA to symbolize five-7% of overall CO2 emissions cement production. To decide the emissions related to 1 kg of cement, the cement manufacturing method is described as all the processes concerned within the production of one kg of cement in keeping with plant. Also, the cement flora covered in EPER is not exclusively synthetic

3. Alumino phosphate cement

Aluminophosphate cementations Ingredients. The newly proposed electrochemical model is used to illustrate aspects related to hydration. The electrochemical resistance conduct of the APC varies with the procedure of hydration, and the hydration time will increase as the ion shipping resistance is activate gradually growing. In addition, Rct1 has a comparable boom law with the compressive strength of APC at some stage in the entire hydration system. Furthermore, Rct1 and the high frequency semicircle regularly decrease its Nyquist curve increasing the water-cement ratio; And after a extraordinary research of the unique boric acid content material of the APC impedance spectrum, it is able to be acquired that it takes extra time for Rct1 to attain the consistent kingdom as the boric acid content material increases. Experimental consequences show that the electrochemical resistance approach is cheap to hit upon the hydration characteristic of alumino phosphate cement arises at the historic moment at this time. APC is an anionic specialty cement with the and present as the primary components. The main hydration products of APC are calcium phosphorus aluminates hydrate, calcium phosphate hydrate, calcium aluminates hydrate, and gels. There is no calcium hydroxide or ettringite formed during the process of the hydration, so it can satisfy the specific environment and special structure durability of engineering requirements. It has very high compressive strength and hydration speed to possess APC of the characteristics as rapid hardening, early strength and high strengthAPC material [216] Aluminophosphate cement has better excessive temperature resistance than silicate cement, with its compressive power barely reduced at better temperatures. The consequences display that the addition of sludge to the aluminophosphate cement does now not boom the compressive energy of the cement at low temperatures, but it is able to in addition boom the extra temperature resistance of the cement. After sludge get admission to, low temperatures reason boom of cement power and excessive temperature resistance. . Aluminophosphate cement is a hydrated hardening fabric and progressed at once. It is characterised through the use of early energy and long-time period energy. This article addresses the problem of excessive temperature compression energy despair and the sale of cement oil exceptions for heavy oil warmth curing wells via adding sludge to aluminophosphate cement. The greater temperature resistance of this cement gadget is higher than that of aluminophosphate or silicate cement. [217The acid-base response among the DBM and phosphate answer produces crystalline nuberite and amorphous phosphates to make certain the initial power and setup time of the SAP geopolymer and is activated via the last phosphate to form aluminosilicate precursors. [218] Aluminophosphate geopolymers metacoline for the first time And integrated using the 50% to 100% with the growth of FA mass fraction inside the raw

material the setup decreases FA content of the composition and microstructure of SAP geopolymers the effects were explored. The results confirmed that a higher FA percentage was induced by The dearth of biodegradable aluminum [219] luminophosphate Manufactured at Perverals Factory Ehmode Powder had SHTV bonding Motor made with identical production facility Tests have been done on In terms of grain-length distribution, the motor is made from genuine chamotte powder aluminophosphate bonds Turned out to be very small and contained clay in their mixtures, we tested the mortars The mixture in it contains Chalmette powder. These motors have low plasticity and had the potential to retain bad water, and their electricity became less efficient with inefficiency

4. Zinc oxide phosphate cement

Zinc oxide and Eugenol Compos. Recently, the EBA Many cements containing And based entirely on system encouraged via Breuer, were Marketed Other zinc oxide and Uniqueness of eugenol cements Powerful instructions Rent to gain progressed residences, which incorporates the Polymers in Eugenia In addition business Are also available in terms of. Zinc oxide and eugenol substances had been Of the respective manufacturers As much as possible according to the guidelines The weight of the powders in proportion Established by determination.[223] For four to seven years Were later withdrawn. Language those cases cemented 12 months take into account' have been protected as screw ups in this don't forget. [224] Zinc oxide Initially low pH Shows It was unexpected Will receive an approximate boom five Five In 15 minutes, then gently close Reacts with within 250 minutes of full dimensional Excessive heat-solution due to fact The reactivity of zinc oxide reduces the specific surface area that can purpose disintegration in the course of curing. Liquids containing one steel ion display the above scenario Reaction fee Than liquids Although slow don't incorporate each steel Ions With a metal ion Will keep drinks with Extending the time But the resulting products aren't sturdy due to the reality they're heterogeneous due to the partial response. [225] Gutta-percha, zinc oxide primarily based adhesives, glass ionomer cements, water repellent cements, polycarbonate cements, polyvinyl cements and most adhesives are a few examples of endothelial substances. Proven to be extensively weaker layers. The mineral trioxide composition has been stepped forward by using torabinazate, which has had maximum success over the ones deficiencies and is in clinically remarkable use. [226] Using the hardest and quickest (minimal) quantity of EBA-eugenol liquid, the whisker within the powder need to be saved to a minimal to hold the appropriate mixing tendencies and to achieve complete bonding between the fiber and the matrix

5. Calcium sulfoaluminate cement

Calcium sulfoaluminate cement is one such cement. It combines low cost and low CO2 emissions finance system with rapid strength boom and compatibility with high quality production materials Hydration provides an internal pore solution in which the pH is lower than that of PC. The basic hydration product, etringite, contains some ions in its crystalline form, making it the best choice for stirring calcium sulfoaluminate or elimide waste, which may be calcium silicate or aluminate or ferrite fraction. The rat is activated or activated by the addition of calcium sulfate with gypsum or anhydrite. $CS^{\bar{}}A$ Cement has been admirably studied and advanced as a manufacturing material in China for almost 30 years and is presently attracting brilliant hobby international. [231] Calcium sulfoaluminate formulations are utilized in Portland cement mixes as compression or self-stress binders. However, $CS^{\bar{}}A$ cements show a few amazing overall performance, as an example, in comparison to Portland clinkers, $CS^{\bar{}}A$ clinkers are greater environmentally pleasant for his or her manufacturing, and due to their lower temperature and higher porosity, calcium sulfoaluminate cements are easier to grind. , Corrosion resistant and has very low tensile power. And plays an absolutely vital role in selling their high quality overall performance based on other engineering companies. [232]. Calcium sulfoaminate, or $C4A3S^{\bar{}}$, has long been called a cementitious cloth, although its homes in improved cement mixtures are not always nicely finalized these days. Calcium sulfominate cements, abbreviated CSAAC, are manufactured in rotary kilns. In China, there is a bent for small-capacity furnaces to be converted to $CS^{\bar{}}AC$ production as soon as they're used for Portland cement manufacturing. Lime, bauxite or aluminum clay and gypsum are stable to calcium, sulfate grows; various vital oxides of clinker are usually diluted with a useful compound in addition to the huge calcium sulfate. Slight increase in MgO and TiO2, contrary to commonplace feel. [233] Calcium sulfoaminate cement is the decided input in excess water cement / ratio, after about eight hours the consumption of calcium sulphate is marked through a pointy drop inside the interest of calcium and sulfate and a upward thrust inside the recognition of aluminum. As the calcium concentration decreases with the source of an detail, the electrode neutrality of the aperture response should be maintained, growing the hydroxide cognition, that's essential for a eleven pH rate. [234] As an instance, to shape monosulfooluminate binding chloride ions, that might reason the material to amplify and crack because of the formation of etringite following outside sulfate attack. With calcium ions, brought on gypsum.

6. Magnesium phosphate cement

Magnesium phosphate cement is regulated with a positive percent of waste magnesia oxide potassium di-hydrogen phosphate and a sure percentage similar to Portland cement. Factors affecting MPC's houses consist of w / c ratio, casting temperature and ash content material, that are examined on this examine. W / c ratio and casting temperature Magnesium phosphate cement is a contemporary shape of binder in which the chemical bond is authentic. The soluble acid is of route absolute reaction among the inert combusted magnesia and the phosphate. Magnesium phosphate cement for w / c ratio of

zero. The casting temperature may have an elegant impact at the MPC placement time. When the temperature is better than 30 C, the shelf lifestyles could be very short. [236] Magnesium phosphate cement motors were explored with notable magnesium to phosphate molar ratios and sand and binder weight ratios. Experimental consequences show that each M / P and S / B ratios have a sizeable impact on MPC mortar laying time and machine housing. [238]. Magnesium phosphate cements are in particular being implemented in wastewater treatment because of their adsorptive houses. Recently moreover they have been examined to have a immoderate functionality as degradable biocements for software program software as opportunity materials for bone defects. In evaluation to degradable calcium phosphate cements they have got the gain of setting at impartial pH that is favorable in organic surroundings magnesium phosphate cements had been tested, concerning the have an effect on of variations in PLR and diammonium citrate content material material material fabric. The motive became to regulate those parameters as a way to gather a best combination of fast setting, mild setting temperature, early strength development, and proper inject ability [239] Magnesium phosphate cements have the capability to chemically bind excessive composition water inside the device via decreasing the pH and offer enough workmanship at water / solid ratios near the preferred theoretical limits for paste saturation.

7. Acrylic bone cement

Acrylic bone cement has been an vital characteristic in orthopedic surgical procedure for many years. Polymethylmethacrylate is used in the fields of ophthalmology and dentistry to orthopedics, acrylic cement is used to repair osteoporotic, neoplastic and spinal fractures. The sturdy phase is characterised by using the catalytic polymer and radio-opacifier of the polymerization reaction; The liquid fraction is characterised by way of the useful capability of the monomer. [241]. The temperature modified into was hoping that on the identical time as decreasing this interfacial temperature, the cement might despite the fact that hold its brief-curing belongings its putting time may not exceed 15 minutes. Acrylic cement. This take a look at critiques a way to reduce the temperature [242]. Acrylic cement method and fusion method with two dreams. Bone cement based on a high foundation is a great deal less soluble, a bargain less volatile and much much less sensitive, low throwing of monomer at interface, low content material of low content cloth monomer and fragrant amines, ok and delivered package, compound and The delivery engine permits available, low porosity mixing and distribution, at the same time as minimizing the publicity of monomer vapors to the working room body of workers. [243]. Acrylic cement is a flooring compound containing the whole quantity of antibiotic inside the matrix of reality. 1,20 Mixing PMMA beneath horrible atmospheric strain reduces the big range and duration of aeration, which is a superb cope with a variety of pores and, consequently, acrylic bone cement. However, including forty g of antibiotic powder to forty g of copolymer powder will not substantially reduce the shrinkage or diameter traction now.

8. Conclusion

The cement sub-zone makes use of 12-15% of the overall industrial energy utilization. Therefore, this subdivision emits CO2 emissions into the environment with the aid of burning fossil fuels to provide the power wished for the cement production machine. Aluminophosphate cementation materials. The newly proposed electrochemical model makes use of the hydration description that acrylic bone cement has been an important feature of for many years in the procedure of orthopedic surgical treatment. Polymethylmethacrylate is used within the fields of ophthalmology and dentistry to orthopedics, acrylic cement is used to restore osteoporotic, neoplastic and spinal fractures. The electrochemical resistance conduct of APC varies with the procedure of hydration, and the hydration time increases as the resistance of the ion transport procedures gradually will increase. Mixture of zinc oxide and eugenol. Recently, EBA has integrated some of cements and is marketed absolutely on the idea of a brewer-based merchandising, with the individuality of different zinc oxides and eugenol cements being advertised. Sulfoaluminate cement is one such cement. It combines low cost and coffee CO2 emissions financing machine, providing an internal perforation solution with speedy strength growth and compatibility with high best synthetic substances, the pH of that is lower than that of PC. Magnesium phosphate cement is regulated with a certain percent of waste magnesia oxide potassium di-hydrogen phosphate and a certain percentage much like Portland cement. Factors affecting MPC's houses include w / c ratio, casting temperature and ash content material, that are tested in this examine. Acrylic bone cement has been an crucial feature in orthopedic surgery for many years. Polymethylmethacrylate has been used within the fields of ophthalmology and dentistry to orthopedics, acrylic cement is used to restore osteoporotic, neoplastic and spinal fractures

References

[1]. Ali, M. B., Rahman Saidur, and M. S. Hossain. "A review on emission analysis in cement industries." Renewable and Sustainable Energy Reviews 15, no. 5 (2011): 2252-2261.

[2]. Van Oss, Hendrik G., and Amy C. Padovani. "Cement manufacture and the environment part II: environmental challenges and opportunities." Journal of Industrial ecology 7, no. 1 (2003): 93-126.

[3]. Qiao, Fei, C. K. Chau, and Zongjin Li. "Property evaluation of magnesium phosphate cement mortar as patch repair material." *Construction and building materials* 24, no. 5 (2010): 695-700.

[4]. Covill, A., N. C. Hyatt, J. Hill, and N. C. Collier. "Development of magnesium phosphate cements for encapsulation of radioactive waste." *Advances in Applied Ceramics* 110, no. 3 (2011): 151-156.

[5]. Magnan, B., M. Bondi, T. Maluta, E. Samaila, L. Schirru, and C. Dall'Oca. "Acrylic bone cement: current concept review." *Musculoskeletal surgery* 97, no. 2 (2013): 93-100.

[6]. Kathiresan, S., & Mohan, B. (2020). Multi-Objective Optimization of Magneto Rheological Abrasive Flow Nano Finishing Process on AISI Stainless Steel 316L. Journal of Nano Research, 63, 98–111.

[7]. Gupta, Arjun, and Rohit Bansal. "E-Governance: A Step Ahead." In 2013 Third International Conference on Advanced Computing and Communication Technologies (ACCT), pp. 359-362. IEEE, 2013.

[8]. Kumar, M. Senthil. "Energy Efficient Techniques for Transmission of Data in Wireless Sensor Networks." (2015).

[9]. Sharma, Neha, and Usha Batra. "A review on spatial domain technique based on image steganography." In 2017 International Conference on Computing and Communication Technologies for Smart Nation (IC3TSN), pp. 24-27. IEEE, 2017.

[10]. Bogue, Robert Herman. "Calculation of the compounds in Portland cement." Industrial & Engineering Chemistry Analytical Edition 1, no. 4 (1929): 192-197.

[11]. Shukla, Piyush Kumar, Vandana Roy, Prashant Kumar Shukla, Anoop Kumar Chaturvedi, Aumreesh Kumar Saxena, Manish Maheshwari, and Parashu Ram Pal. "An advanced EEG motion artifacts eradication algorithm." The Computer Journal (2021).

[12]. Fatma, Gulnaz. A Short History of the Short Story: Western and Asian Traditions. Loving Healing Press, 2012.

[13]. D. Chandra Prakash, RC. Narayanan, N. Ganesh, M. Ramachandran, S. Chinnasami, R. Rajeshwari. "A study on image processing with data analysis. "In AIP Conference Proceedings, vol. 2393, no. 1, p. 020225. AIP Publishing LLC, 2022.

[14]. P. K. Chidambaram; Dr. Amol Lokhande; Dr. M. Ramachandran; Vimala Saravanan; Vidhya Prasanth, "A Review on Biodiesel Properties and Fatty acid composites", REST Journal on Emerging trends in Modelling and Manufacturing, 7(3), (2021): 87-93

[15]. Chen, Chanratana, Guillaume Habert, Youcef Bouzidi, and Agnès Jullien. "Environmental impact of cement production: detail of the different processes and cement plant variability evaluation." Journal of Cleaner Production 18, no. 5 (2010): 478-485

[16]. Rajesh, G., Mercilin Raajini, X., Ashoka Rajan, R., Gokuldhev, M., Swetha, C. (2020). A Multi-objective Routing Optimization Using Swarm Intelligence in IoT Networks. In: Peng, SL., Son, L.H., Suseendran, G., Balaganesh, D. (eds) Intelligent Computing and Innovation on Data Science. Lecture Notes in Networks and Systems, vol 118. Springer, Singapore.

[17]. Bansal, Rohit, Ankur Gupta, Ram Singh, and Vinay Kumar Nassa. "Role and impact of digital technologies in E-learning amidst COVID-19 pandemic." In 2021 Fourth International Conference on Computational Intelligence and Communication Technologies (CCICT), pp. 194-202. IEEE, 2021.

[18]. Sharma, Neha, and Usha Batra. "Performance analysis of compression algorithms for information security: A Review." EAI Endorsed Transactions on Scalable Information Systems 7, no. 27 (2020).

[19]. Pathak, Yadunath, Prashant Kumar Shukla, Akhilesh Tiwari, Shalini Stalin, and Saurabh Singh. "Deep transfer learning based classification model for COVID-19 disease." Irbm (2020).

[20]. Dong, Biqin, Jianchao Zhang, Yuqing Liu, Guohao Fang, Zhu Ding, and Feng Xing. "Tracing hydration feature of aluminophosphate cementitious materials by means of electrochemical impedance method." Construction and Building Materials 113 (2016): 997-1006.

[21]. Jamshed, Mohammad, Gulnaz Fatma, and Sujan Mondal. "Deconstructing the Weaponization of Faith and Nationalism with A Special Reference to Bankim Chandra Chatterjee's Anandamath." Review of International Geographical Education Online 11, no. 7 (2021).

[22]. Deepa, N., Asmat Parveen, Anjum Khurshid, M. Ramachandran, C. Sathiyaraj, and C. Vimala. "A study on issues and preventive measures taken to control Covid-19." In AIP Conference Proceedings, vol. 2393, no. 1, p. 020226. AIP Publishing LLC, 2022.

[23]. S. Sowmiya; M.Ramachandran; Sathiyaraj Chinnasamy; Vidhya Prasanth; Soniya Sriram, "A Study on Humanoid Robots and Its Psychological Evaluation", Design, Modelling and Fabrication of Advanced Robots, 1(1), (2022): 48-54.

[24]. Shatjit yadav; M. Ramachandran; Vimala Saravanan; S. Sowmiya; Soniya Sriram, "Exploring Recent Trends in Solar Energy Application", Renewable and Nonrenewable Energy, 1(1), (2022): 30-38.

[25]. Li, Zaoyuan, Yan Wang, Xiaowei Cheng, and Xiaoyang Guo. "The Slag Influence on High Temperature Resistance of Aluminophosphate Cementfor Heavy Oil Thermal Recovery." High Temperature Materials and Processes 33, no. 4 (2014): 325-328.

[26]. Bansal, Rohit. "Challenges and future trends in commerce education in India." International Journal of Techno-Management Research 5, no. 3 (2017): 25-35.

[27]. Meyyappan, Senthilkumar, and Sridhathan Chandramouleeswaran. "Plant Infection Detection Using Image Processing." Article July (2018).

[28]. Sharma, Neha, and Usha Batra. "An enhanced Huffman-PSO based image optimization algorithm for image steganography." Genetic Programming and Evolvable Machines 22, no. 2 (2021): 189-205.

[29]. Roy, Vandana, Prashant Kumar Shukla, Amit Kumar Gupta, Vikas Goel, Piyush Kumar Shukla, and Shailja Shukla. "Taxonomy on EEG artifacts removal methods, issues, and healthcare applications." Journal of Organizational and End User Computing (JOEUC) 33, no. 1 (2021): 19-46.

[30]. Wang, Yan-Shuai, Yazan Alrefaei, and Jian-Guo Dai. "Improvement of early-age properties of silico-aluminophosphate geopolymer using dead burnt magnesia." Construction and Building Materials 217 (2019): 1-11.

[31]. Fatma, Gulnaz, Nahla Pirzada, and Sameena Begum. "Problems, Illusions and Challenges Faced by a non-Arabic Speaker in Understanding Quran: A Sub-Continental Study." Journal of Positive School Psychology 6, no. 2 (2022): 5422-5426.

[32]. DiPisa, Joseph A., George S. Sih, and Arnold T. Berman. "The temperature problem at the bone-acrylic cement interface of the total hip replacement." *Clinical orthopaedics and related research* 121 (1976): 95-98.

[33]. Kindt-Larsen, Ture, Daniel B. Smith, and Jørgen Steen Jensen. "Innovations in acrylic bone cement and application equipment." *Journal of Applied Biomaterials* 6, no. 1 (1995): 75-83.

[34]. Kuechle, David K., GLENN C. Landon, DANIEL M. Musher, and PHILIP C. Noble. "Elution of vancomycin, daptomycin, and amikacin from acrylic bone cement." *Clinical orthopaedics and related research* 264 (1991): 302-308.

[35]. Fegade, Vishal, Krishnakumar Gupta, M. Ramachandran, S. Madhu, C. Sathiyaraj, R. Kurinji< alar, and M. Amudha. "A study on various fire retardant additives used for fire reinforced polymeric composites." In AIP Conference Proceedings, vol. 2393, no. 1, p. 020107. AIP Publishing LLC, 2022.

[36]. Allan J Wilson, D.R. Pallavi, M. Ramachandran, Sathiyaraj Chinnasamy, S. Sowmiya, "A Review On Memetic Algorithms and Its Developments", Electrical and Automation Engineering, 1(1), (2022): 7-12.

[37]. Sathiyaraj Chinnasamy; M. Ramachandran; Kurinjimalar Ramu; Manjula Selvam: Sowmiya Soundhraj, "Exploring the Possibility of Urban Agriculture Farn", Agricultural, Biologicals and Food Science, 1(1), (2022):1-8.

[38]. Guo, Haozhe, Baifa Zhang, Liangliang Deng, Peng Yuan, Mengyuan Li, and Qiang Wang. "Preparation of high-performance silico-aluminophosphate geopolymers using fly ash and metakaolin as raw materials." Applied Clay Science 204 (2021): 106019.

[39]. Kumar, M. Senthil, and Ashish Chaturvedi. "Energy-Efficient Coverage and Prolongs for Network Lifetime of WSN using MCP." (2012).

[40]. Kumar Shukla, Prashant, Piyush Kumar Shukla, Poonam Sharma, Paresh Rawat, Jashwant Samar, Rahul Moriwal, and Manjit Kaur. "Efficient prediction of drug–drug interaction using deep learning models." IET Systems Biology 14, no. 4 (2020): 211-216.

[41]. Fatma, Dr Gulnaz. "Asian Literary Supplement (ISSN 2278-5051) Identity, Homelessness and Isolation in" The Room on the Roof." Asian Literary Supplement (2012): 2278-5051.

[42]. Bron, V. A., A. I. Uzberg, T. P. Karzhavina, and G. S. Krotova. "Aluminophosphate bonded refractory mortars." Refractories 13, no. 1 (1972): 37-41.

[43]. Fegade, Vishal, M. Ramachandran, S. Madhu, C. Vimala, R. Kurinji Malar, and R. Rajeshwari. "A review on basalt fibre reinforced polymeric composite materials." In AIP Conference Proceedings, vol. 2393, no. 1, p. 020172. AIP Publishing LLC, 2022.

[44]. Kurinjimalar Ramu; M. Ramachandran; M. Nathiya; M. Manjula, "Green Supply Chain Management; with Dematel MCDM Analysis", Recent trends in Management and Commerce, 2(3), (2021): 8-15.

[45]. P.K. Chidambaram; M. Ramachandran; Vimala Saravanan; Chinnasami Sivaji; S. Sowmiya, "A Study on Input and Response Process Parameter for Drilling Operation", Design, Modelling and Fabrication of Advanced Robots, 1(1), (2022): 37-42.

[46]. Phillips, R. W., M. L. Swartz, R. D. Norman, R. J. Schnell, and B. F. Niblack. "Zinc oxide and eugenol cements for permanent cementation." The Journal of Prosthetic Dentistry 19, no. 2 (1968): 144-150.

[47]. Vimalarani, C. I., and M. Senthilkumar. "Energy Efficient PCP protocol for k-coverage in Sensor networks." Proc IEEE (2010).

[48]. Rathore, Neeraj Kumar, Neelesh Kumar Jain, Prashant Kumar Shukla, UmaShankar Rawat, and Rachana Dubey. "Image forgery detection using singular value decomposition with some attacks." National Academy Science Letters 44, no. 4 (2021): 331-338.

[49]. Fatma, Gulnaz. Ruskin Bond's World: Thematic Influences of Nature, Children, and Love in his Major Works. Vol. 12. Loving Healing Press, 2013.

[50]. Silvey, Ralph G., and George E. Myers. "Clinical studies of dental cements: V. Recall evaluation of restorations cemented with a zinc oxide-eugenol cement and a zinc phosphate cement." Journal of Dental Research 55, no. 2 (1976): 289-291.

[51]. Gupta, Krishnakumar, Vishal Fegade, Jeevan Kittur, M. Ramachandran, S. Madhu, S. Chinnasami, and M. Amudha. "A review on effect of cooling rate in fiber reinforced polymeric composites." In AIP Conference Proceedings, vol. 2393, no. 1, p. 020106. AIP Publishing LLC, 2022.

[52]. Vimala Saravanan; M. Ramachandran; T. Vennila; G. Mathivanan, "A Study on Multi-Objective Optimization on the basis of Ratio Analysis", Recent trends in Management and Commerce, 2(3), (2021): 16-22.

[53]. C. Venkateswaran, M. Ramachandran, Vimala saravanan, T. Vennila, "A Study on Artificial lntelligence with Machine Learning and Deep Learning Techniques", Data Analytics and Artificial Intelligence, 1(1), (2021): 32-37.

[54]. Park, C-K., M. R. Silsbee, and D. M. Roy. "Setting reaction and resultant structure of zinc phosphate cement in various orthophosphoric acid cement-forming liquids." Cement and concrete research 28, no. 1 (1998): 141-150.

[55]. Subburam, S., Selvakumar, S. & Geetha, S. High performance reversible data hiding scheme through multilevel histogram modification in lifting integer wavelet transform. Multimed Tools Appl 77, 7071–7095 (2018).

[56]. Bansal, Rohit. "Stress management at workplace." Internacional Journal of Techno-Management Research 5, no. 04 (2018): 29-32.

[57]. Bhatt, Ruby, Priti Maheshwary, Piyush Shukla, Prashant Shukla, Manish Shrivastava, and Soni Changlani. "Implementation of fruit fly optimization algorithm (FFOA) to escalate the attacking efficiency of node capture attack in wireless sensor networks (WSN)." Computer Communications 149 (2020): 134-145.

[58]. Ogata, Hidehiro, Makoto Hayashi, Hiromasa Tsuda, Naoto Suzuki, Masao Maeno, Akiyoshi Sugawara, and Bunnai Ogiso. "Effects of a calcium phosphate cement on mineralized nodule formation compared with endodontic cements." Dental materials journal 31, no. 1 (2012): 92-97

[59]. Gulnaz, Fatma. "Patriarchy and Human Relationships." Web. 25th Feb (2015).

[60]. Ataur rahman farooqi; D R pallavi; M. Ramachandran; S. Sowmiya; Manjula Selvam, "A Brief Study On Recent Trends in Financial Literacy", Recent trends in Management and Commerce, 3(1), (2022): 40-45.

[61]. Brauer, G. M., Richard Mc Laughlin, and E. F. Huget. "Aluminum oxide as a reinforcing agent for zinc oxide-eugenol-o-ethoxybenzoic acid cements." Journal of Dental Research 47, no. 4 (1968): 622-628.

[62]. Kumar, R. Dinesh, C. Sridhathan, and M. Senthil Kumar. "Performance Evaluation of Different Neural Network Classifiers for Sanskrit Character Recognition." In Business Intelligence for Enterprise Internet of Things, pp. 185-194. Springer, Cham, 2020.

[63]. Alalmai, Ali, and Dr Gulnaz Fatma. "A., Arun & Aarif, Mohd.(2022). Significance and Challenges of Online Education during and After Covid-19. Türk Fizyoterapi ve Rehabilitasyon Dergisi." Turkish Journal of Physiotherapy and Rehabilitation 32: 6509-6520.

[64]. C. Venkateswaran; M. Ramachandran; Sathiyaraj Chinnasamy; S. Sowmiya; Manjula Selvam, "Exploring Various Tourism and Its Implication", Recent trends in Management and Commerce, 3(2), (2022): 72-78

[65]. . Zhou, Q., N. B. Milestone, and M. Hayes. "An alternative to Portland cement for waste encapsulation—the calcium sulfoaluminate cement system." Journal of hazardous materials 136, no. 1 (2006): 120-129.

[66]. C. Venkateswaran, M. Ramachandran, M. Amudha, T. Vennila, M. Manjula, "A Review on Differential Evolution Optimization Techniques", Data Analytics and Artificial Intelligence, 1(1), (2021): 24-31.

[67]. Bernardo, Graziella, Antonio Telesca, and Gian Lorenzo Valenti. "A porosimetric study of calcium sulfoaluminate cement pastes cured at early ages." Cement and concrete research 36, no. 6 (2006): 1042-1047.

[68]. Kumar, M. Senthil, and Ashish Chaturvedi. "A novel enhanced coverage optimization algorithm for effectively solving energy optimization problem in WSN." Research Journal of Applied Sciences, Engineering and Technology 7, no. 4 (2014): 696-701.

[69]. Shukla, Prashant Kumar, Jasminder Kaur Sandhu, Anamika Ahirwar, Deepika Ghai, Priti Maheshwary, and Piyush Kumar Shukla. "Multiobjective genetic algorithm and convolutional neural network based COVID-19 identification in chest X-ray images." Mathematical Problems in Engineering 2021 (2021).

[70]. C. Venkateswaran; Dr. V. Pavithra; M. Ramachandran; Manjula Selvam, "Selection of Candidate for a Project Using WASPAS Method", Recent trends in Management and Commerce, 3(2), (2022):79-86

[71]. Glasser, Fredrik Paul, and Liang Zhang. "High-performance cement matrices based on calcium sulfoaluminate–belite compositions." Cement and Concrete Research 31, no. 12 (2001): 1881-1886.

[72]. Stalin, Shalini, Vandana Roy, Prashant Kumar Shukla, Atef Zaguia, Mohammad Monirujjaman Khan, Piyush Kumar Shukla, and Anurag Jain. "A machine learning-based big EEG data artifact detection and wavelet-based removal: an empirical approach." Mathematical Problems in Engineering 2021 (2021).

[73]. Alalmai, Ali A., Gulnaz Fatma, A. Arun, and Mohd Aarif. "Significance and Challenges of Online Education during and After Covid-19." Turkish Journal of Physiotherapy and Rehabilitation 32, no. 2.

[74]. Winnefeld, Frank, and Barbara Lothenbach. "Hydration of calcium sulfoaluminate cements—Experimental findings and thermodynamic modelling." Cement and Concrete Research 40, no. 8 (2010): 1239-1247.

[75]. Khambra, Geetanjli, and Prashant Shukla. "Novel machine learning applications on fly ash based concrete: an overview." Materials Today: Proceedings (2021).

[76]. Pandit, Shraddha, Piyush Kumar Shukla, Akhilesh Tiwari, Prashant Kumar Shukla, Manish Maheshwari, and Rachana Dubey. "Review of video compression techniques based on fractal transform function and swarm intelligence." International Journal of Modern Physics B 34, no. 08 (2020): 2050061.

[77]. Tan, Bowen, Monday U. Okoronkwo, Aditya Kumar, and Hongyan Ma. "Durability of calcium sulfoaluminate cement concrete." Journal of Zhejiang University-SCIENCE A 21, no. 2 (2020): 118-128.

[78]. Li, Yue, and Bing Chen. "Factors that affect the properties of magnesium phosphate cement." Construction and Building Materials 47 (2013): 977-983.

[79]. Qiao, Fei, C. K. Chau, and Zongjin Li. "Property evaluation of magnesium phosphate cement mortar as patch repair material." Construction and building materials 24, no. 5 (2010): 695-700.

