



# The Development of Terminal Alkynes in Water Using DEMATEL Method

Chinnasami Sivaji

REST Labs, Kaveripattinam, Krishnagiri, Tamil Nadu, India.

Corresponding author Email: [chinnasami@restlabs.in](mailto:chinnasami@restlabs.in)

**Abstract.** In organic chemistry, an alkyne is an unsaturated hydrocarbon that has at least one carbon-carbon triple bond. All three alkynes are unsaturated hydrocarbons containing alkynes. The general formula is  $C_nH_{2n-2}$  and the bond is called 'acetylenic bond'. The functional group in the alkyne is a carbon-carbon triple bond. Aromatics are  $\pi$  bonds, odd number of electron in the system, planar with pairs, fully coupled and are cyclic structures. In which test to conclude from analysis and Evaluation Laboratory (DEMATEL) of complex system components. A cause-and-effect chain is considered correct. One of the best to identify. It values relationships interdependence between factors and identification through visual structural modeling. Important to see. Alternative: Propene ( $C_3H_6$ ), Butene ( $C_4H_8$ ), Pentene ( $C_5H_{10}$ ), Hexene ( $C_6H_{12}$ ), Heptene ( $C_7H_{14}$ ). Evaluation Preference: Propene ( $C_3H_6$ ), Butene ( $C_4H_8$ ), Pentene ( $C_5H_{10}$ ), Hexene ( $C_6H_{12}$ ), Heptene ( $C_7H_{14}$ ). The result it is seen that Hexene ( $C_6H_{12}$ ) is got the first rank where as is the Pentene ( $C_5H_{10}$ ) is having the lowest rank. The value of the dataset for Alkynes in Test and evaluate decision making the lab shows that it results in Hexene ( $C_6H_{12}$ ) and top ranking.

## 1. Introduction

In organic chemistry, an alkyne is an unsaturated one is a hydrocarbon that has at least one carbon-carbon triple bond involving carbon. Alkynes have a triple bond are unsaturated hydrocarbons containing alkynes. The general formula is  $C_nH_{2n-2}$  and the bond is called 'acetylenic bond' is called Alkynes are present carbon-carbon triple bonds. Organic molecules made up of functional groups and those with the empirical formula of  $C_nH_{2n-2}$  is written. They are unsaturated hydrocarbons. Alkenes are  $-ENE$  Alkynes have the suffix  $-yne$ . Use the result; There is only one alkyne in the molecule this suffix is used when the functional group in an alkyne is one carbon-carbon triple bond. Aromatics are  $\pi$  bonds, odd number of electron in the system, planar with pairs, fully coupled and are cyclic structures. Alkynes are traditionally called acetylenes are called, Although the name acetylene refers specifically to  $C_2H_2$ , which is the IUPAC nomenclature. Used formally called ethane. Decision Making Test and Evaluation Laboratory (DEMATEL) The cause-and-effect chain elements of a complex system is considered a useful method for identification. This is assessing relationships between factors and Identify what is important through a visual structural model to see. Results Testing and Evaluation Laboratory (DEMATEL) method complex and interrelated problem groups Analyzed and proposed to solve. of its ability to verify interdependencies between variables and tries to improve them by providing a specific diagram. The To assess the causal relationships of construction accidents DEMATEL method is used. This combination is human to the imprecise and subjective nature of judgments is used. Fuzzy set theory is real Interval sets rather than numbers uses. Linguistic terms converted into fuzzy numbers.

## 2. Alkynes

$PtCl_4$  exhibits great Catalytic activity Higher electrophilicity than  $PtCl_2$  and activity due to high solubility. Functional Ft molecules, phenols, protected amines, The reaction can be extended to halides and esters. of Substituted and Terminal Alkynes. in the aromatic ring Electron-releasing groups are usually this Ft Increases the reactivity of molecules; Aroma ring At least one electron to the required reaction Donor Committee [1]. The review provides carried out under palladium catalysis Using processes to prepare compounds Using alkynes as starting materials An overview of leading to various chemicals Different reactions are included in such review Fully of all possibilities Trying to hide to accept detail as an enormous task will be [2] The from terminal alkynes to the classical textbook method Presynthesis of metal acetylides is required. Alkyl Grignard reactions, Alkyl lithium As reactions and metal settings, air and are often more sensitive to water, and tolerated under several functional groups Can not. These conditions and thus "security" needed. acids to eventually quench the reaction should be included. [3] from terminal alkynes to the classical textbook method Presynthesis of metal acetylides is required. Alkyl Grignard reactions, Alkyl lithium reactions and metal amides Therefore, such reactions are often air and water The sensitivity is high, and multi-functional Under groups cannot be tolerated. These conditions and thus requires "protection". To mitigate the reaction Acids should be added. [4] Nickel catalysts are anti-acidic C-H of terminal alkynes That is useful for the functioning of bonds reported. On the other hand, bonded to arenes Acidity of fluorine ortho hydrogens known to increase. with nickel (0) species We functionalize the C-H bonds of fluorines We have consider,

followed by alkynes Possible insertion. [5] Special properties of allizer for alkyne functionalization Silver reveals because its d10 is electronic With the carbon-carbon P-bond of structural alkynes, Supports contacts such as alkinophilicity; Therefore, the carbon-carbon triple bond is silver one most powerful activators Considered. [6] Here of using allyl cyanides Alkynes carcosanesis We report. Current Allylcyanation reaction is a terminal double bond or a single linear C3 containing a carbonyl group Allows installation on time. [8] The development of Homologous and for half-reduction of alkynes Heterogeneous catalysts, Substrate scope, selectivity And in terms of simplicity of the application a procedure for Lindler catalysis No replacement will be offered. Consequently, and with it Despite the associated problems, Lindler The catalyst is most alkynes is the reverse of the preference for semi-reduction. [9] Electrophonic ring closure occurs when alkynes are functionalized, A in the  $\delta$  position from the carbon triple bond Having a nucleophilic group, is electrophilic Submitted to cyclization, the ICL was electrophilic uses [10]. The first catalyst [11] Reaction conditions are bulky groups and meta and electron withdrawal in para states and Donor groups are. However, ortho-substitution The use of alkynes made is not reactive, Presumably for serious reasons. Significantly, In each case only the Z isomer is given, Also no E isomer was observed [12]. A new basis leading to high synthetic efficiency of current interest in developing reactions In the light, carboxylic acid chlorides in water forming direct coupling with terminal alkynes Very desirable. However, carboxylic acid Halides are very water sensitive Common sense [13]. Metal-catalyzed carbocyclization of alkynes functionalized Of particular note are external nucleophiles, Because it is an addition to carbocyclic products Introduces the function. Such layer The reactions are Complex molecular structures can be evaluated Since significant economic and environment There are advantages one shift. [14] This includes the group of terminal alkynes because the proton is a better migrant, but this isomerization also has priority for conjugated internal alkynes. [15]. A [16] Among the potential methods to access arylenes, of metal-catalyzed stereo- and alkynes Regioselective hydrolylation reactions are substantial have attracted attention because the changes are numerous and allow access to redox-economical arylenes. from readily available arenes and alkynes [17] the current The method is not without limitations. Diphenyl acetylene and internal alkynes such as 4-octane would be expected We do not form oxidizing compounds We felt In case of diphenyl acetylene, 20% Pencil's desired nitro mixture Without a trace isolated. [18]. with alkynes to form carbonyl compounds Adding water is an artificial method. Change is a As dihydro, oxo-bioaddition classified, but usually of the triple bond Can be broken down into hydro-hydroxylation, it continuously tautomerization of the intermediate alkenol. [19] Alkynes are useful in organic synthesis Construction blocks Blocks, they can be easily described. Among them Most important applications are for cis alkenes Their controlled reduction is reliable and is a common synthetic method. with a high degree of control over chemical efficiency and geometry. [20] that can contract with a strong base to produce a nucleophile. [21] The Replacement metals, especially metal complexes and lanthanide salts, protic acids and The mechanism is catalyst with iodonium cases of alkynes, arenes or heteroarenes catalyzed by the corresponding reactions. Reactions focus on review. [23]. Hydroarylation methods Three are Key used for heterocyclic synthesis Can be classified as categories. The type of verb and Depending on the precursors involved: (1) palladium- Hec of catalytic reduction of alkynes to alkynes reactions for halides, (2) DM-catalyzed conjugate Arylation reactions. Alkynes are arylboronic acids and (3) DM-catalyzed aromatic C-H with alkynes Alkenylations [25].

### 3. DEMATEL

Attempts to present an index of factors influencing Management Performance of Expressway Construction Project And the symbolic method by the Dematel Research Method Upgrading. Expressway Construction Project Major Factors Affecting Managerial Performance to find out. [1] A method used Many industries and companies called DEMATEL is called economic and social value chain Identify important factors for moving This method was originally developed by Vehicle Factors affecting industries like It is used for identification [2]. Combine DEMATEL with Descriptive Structural Modeling (ISM). Logical relationships in failure subsystems intuitively represent a multilevel hierarchy System, one failure results in another failure Determines and deep failure subsystem identifies. [3] To improve the TYPE OF RESEARCH WHEN USING THE DEMATEL METHOD Another is expressed in two aspects A significant area is: collection of assessment information and Determination of limits. In this study, the magnitude of the impact HFLTS is used to collect; K-mediods clustering A subjective determination of the algorithmic threshold is substituted for this Instead of this, the standard setting structure, and the influence relationship is extended to more than two categories. [4] Demonstrate relationships between factors and the type and basis of relationships of their effects on each other's criteria Prioritize intensity. In addition, hybrid The most advantage of Fuzzy DEMATEL is that Considering the degree of ambiguity, It is also about dealing with ambiguity flexibly. [5] However, the DEMATEL instrument interscales Expresses relationship and type of relationships and Based on a critique of their implications gives priority. ISM is their bias and driving force Creates relationships through, but not through significance [6]. DEMATEL Method and Bayesian Network Bayesian To configure a combination of network structures Lays a solid foundation. This is the method A traditional Bayesian network architecture various properties and Improves scientific character. [7] Practical for visualizing A system of complex causal relationships and a system Clarify the essentials. It is Digraf and One based on matrix theory Systematic, and many other factors are cause and effect Has the ability to divide into groups. to the system Analysis of direct and indirect relationships between By doing components, DEMATEL can obtain a better way to solve interrelated problems.[8]. Modified-DEMATEL method and fuzzy set theory MCDM used as tools. End makers use their past experiences and they tend to make judgments based on knowledge, and their assessments are often equally linguistic expressed in words. [9]. Actual data sourced from Indian GST DEMATEL in designing the hybrid method for the set Focus on approach and project outcome A software system for estimating factors is provided. [10] Barriers to effective implementation of Green Lean already exist were identified from the literature in which were, the same

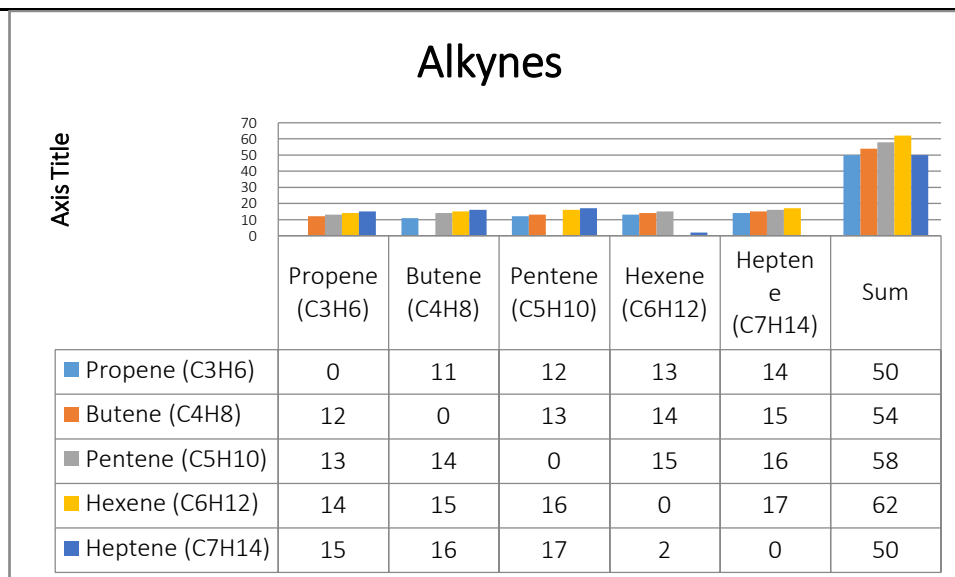
DM model of situational relationships between constraints in time were investigated with the help of method. Green in production Barriers to adopting lean practices are literature were identified through the study. [11] A demodel-fuzzy TOPSIS by Nilashi et al The attitude. Will affect medical tourism in Malaysia The authors discussed the factors, To examine the influencing relationships between factors Dematerial method is used and factors Fuzzy topsies to determine importance ranking used [12] One of the solution methods used in the work is DEMATEL Is. The primary advantage of this method, compromised An implicit cause-and-effect model is the Add relationship. DEMATEL is its components a system or between several available alternatives A useful tool for exploring structure and relationships is proper. [13]. Establishing a rating structure model, combined factor For analysis and determination of the weight of the criterion DEMATEL method is also introduced. In real valuation problems, complex valuation It is difficult to calculate the exact value of the method. However, Makes a complex assessment environment much easier Can be divided into criteria or sub-systems [14]. According to surveys and oral expert interviews, company quality and two key of financial skills and debt Criteria are identified. Method and Using DEMATEL to analyze causal relationships, Severity of sub-indexes of each scale and Performance is determined, and supplier Estimation is inherently imprecise. by MATLAB software. [15]. A hybrid method with two phases, Expert Judges, a standard interpretation method and one including dematel Size grid awareness and general applicability Used to express character. Of the smart city and evaluate its dimensions by DEMATEL.[16] Interdependence of the five key criteria Dematel is used to identify. External Organizational Environment and sustainability are the cause but the plan And the results of project management results In the final stage of Fuzzy DEMATEL, the key parameter relationship is Of influence between graphs and scales Depicts the flow. it. [17]. To establish internal biases and their intensity, fuzzy DEMATEL method Proposed. In the network structure Brainstorm external biases or nominal group technique, through Delphi technique and other suitable methods Decision makers can decide. so on. [18]. DEMATEL-Entropy-TODIM to rank alternative sites the method is also used. Dematel times, entropi Weight method and TODIM method are different MCDM although widely used for problems, for us As far as known, all these three decision methods are LSWF are integrated and used for research. [19]. Because A clear scale to evaluate CoQ models and No accounting standard, the COQ model of the cost structure Conclusion Quality managers or quality data collectors is left to judgement. Therefore, the group DEMATEL and integrated MCDM combining ANP methods We proposed the model to measure expert opinions It is also to solve the problem of choosing the optimal CoQ model. [20] Causality between the components of a system and Dematel technique in analyzing the effect relationships will be useful. Methodology examines contextual interactions between factors under investigation to further address complex issues in the system under investigation [22]. Internal dependencies refer For interactions of components in the system, external dependencies Are derived from the external environment. Interconnect For dependencies, between components in a system Consider the relationships within and their impact on each other With, we use the DEMATEL method. [23]. Technological Innovation in Indian Real Estate Industry And to measure human resource invention skills An attempt to fill the literature gap using [24].

#### 4. Analysis and Discussion

TABLE 1. Alkynes

	Propene (C3H6)	Butene (C4H8)	Pentene (C5H10 )	Hexene (C6H12)	Heptene (C7H14 )	Sum
Propene (C3H6)	0	11	12	13	14	50
Butene (C4H8)	12	0	13	14	15	54
Pentene (C5H10)	13	14	0	15	16	58
Hexene (C6H12)	14	15	16	0	17	62
Heptene (C7H14)	15	16	17	2	0	50

TABLE 1. Alkynes show the Propene (C3H6) it is seen that Heptene (C7H14) the highest value for Butene (C4H8) is showing the lowest value. Butene (C4H8) it is seen that Heptene (C7H14) is showing the highest value for Propene (C3H6) is showing the lowest value. Pentene (C5H10) it is seen that Heptene (C7H14) is showing the highest value for Propene (C3H6) is showing the lowest value. Hexene (C6H12) it is seen that the Pentene (C5H10) is showing the highest value for Heptene (C7H14) is showing the lowest value. Heptene (C7H14) it is seen that the Hexene (C6H12) is showing the highest value for Propene (C3H6) is showing the lowest value. Table 1 shows that DEMATEL Decision making trail and evaluation laboratory in Alternative: Propene (C3H6), Butene (C4H8), Pentene (C5H10), Hexene (C6H12), Heptene (C7H14). Evaluation Preference: Propene (C3H6), Butene (C4H8), Pentene (C5H10), Hexene (C6H12), Heptene (C7H14).



Alternative: Propene (C3H6), Butene (C4H8), Pentene (C5H10), Hexene (C6H12), Heptene (C7H14). Evaluation Preference: Propene (C3H6), Butene (C4H8), Pentene (C5H10), Hexene (C6H12), Heptene (C7H14).

**TABLE 2.** Normalisation of direct relation matrix

Normalisation of direct relation matrix					
	Propene (C3H6)	Butene (C4H8)	Pentene (C5H10)	Hexene (C6H12)	Heptene (C7H14)
Propene (C3H6)	0	1	1.090909091	1.18181818	1.272727273
Butene (C4H8)	1.090909091	0	1.181818182	1.27272727	1.363636364
Pentene (C5H10)	1.181818182	1.272727273	0	1.36363636	1.454545455
Hexene (C6H12)	1.272727273	1.363636364	1.454545455	0	1.545454545
Heptene (C7H14)	1.363636364	1.454545455	1.545454545	0.18181818	0

Table 2 shows that the Normalizing of direct relation matrix in Propene (C3H6), Butene (C4H8), Pentene (C5H10), Hexene (C6H12), Heptene (C7H14). The diagonal value of all the data set is zero.

**TABLE 3.** Calculate the total relation matrix

Calculate the total relation matrix					
	Propene (C3H6)	Butene (C4H8)	Pentene (C5H10)	Hexene (C6H12)	Heptene (C7H14)
Propene (C3H6)	0	1	1.090909091	1.181818182	1.27272727
Butene (C4H8)	1.090909091	0	1.181818182	1.272727273	1.36363636
Pentene (C5H10)	1.181818182	1.272727273	0	1.363636364	1.45454545
Hexene (C6H12)	1.272727273	1.363636364	1.454545455	0	1.54545455
Heptene (C7H14)	1.363636364	1.454545455	1.545454545	0.181818182	0

Table 3Shows the Calculate the total relation matrix in Propene (C3H6), Butene (C4H8), Pentene (C5H10), Hexene (C6H12), Heptene (C7H14).

**TABLE 4. I**

I				
1	0	0	0	0
0	1	0	0	0
0	0	1	0	0
0	0	0	1	0
0	0	0	0	1

Table 4Shows the  $T = Y(I - Y)^{-1}$ , I= Identity matrix in Propene (C3H6), Butene (C4H8), Pentene (C5H10), Hexene (C6H12), Heptene (C7H14) is the common Value.

**TABLE 5. Y**

Y				
0	1	1.09090909	1.18181818	1.272727
1.090909091	0	1.18181818	1.27272727	1.363636
1.181818182	1.272727273	0	1.36363636	1.454545
1.272727273	1.363636364	1.45454545	0	1.545455
1.363636364	1.454545455	1.54545455	0.18181818	0

Table 5 Shows the Y Value in Propene (C<sub>3</sub>H<sub>6</sub>), Butene (C<sub>4</sub>H<sub>8</sub>), Pentene (C<sub>5</sub>H<sub>10</sub>), Hexene (C<sub>6</sub>H<sub>12</sub>), Heptene (C<sub>7</sub>H<sub>14</sub>) is the Calculate the total relation matrix Value and Y Value is the same value.

**TABLE 6. I-Y**

I-Y				
1	-1	1.09091	1.18182	1.27273
-1.09090909	1	1.18182	1.27273	1.36364
-1.18181818	1.27273	1	1.36364	1.45455
-1.27272727	1.36364	1.45455	1	1.54545
-1.36363636	1.45455	1.54545	0.18182	1

Table 6 Shows the I-Y Value Propene (C<sub>3</sub>H<sub>6</sub>), Butene (C<sub>4</sub>H<sub>8</sub>), Pentene (C<sub>5</sub>H<sub>10</sub>), Hexene (C<sub>6</sub>H<sub>12</sub>), Heptene (C<sub>7</sub>H<sub>14</sub>) table 4 T= Y(I-Y)-1, I= Identity matrix and table 5 Y Value Subtraction Value.

**TABLE 7. (I-Y)-1**

(I-Y)-1				
0.336534	-0.17264	-0.160813495	-0.0678	-0.14578
-0.16756	0.301006	-0.166692138	-0.07018	-0.15371
-0.17116	-0.16219	0.268134657	-0.07228	-0.16069
-0.17436	-0.16651	-0.160167452	0.333265	-0.16689
-0.08103	-0.07852	-0.076483852	-0.24564	0.298936

Table 7 shows the (I-Y)-1 Value Propene (C<sub>3</sub>H<sub>6</sub>), Butene (C<sub>4</sub>H<sub>8</sub>), Pentene (C<sub>5</sub>H<sub>10</sub>), Hexene (C<sub>6</sub>H<sub>12</sub>), Heptene (C<sub>7</sub>H<sub>14</sub>) Table 6 shown the Minverse Value.

**TABLE 8. Total Relation matrix (T)**

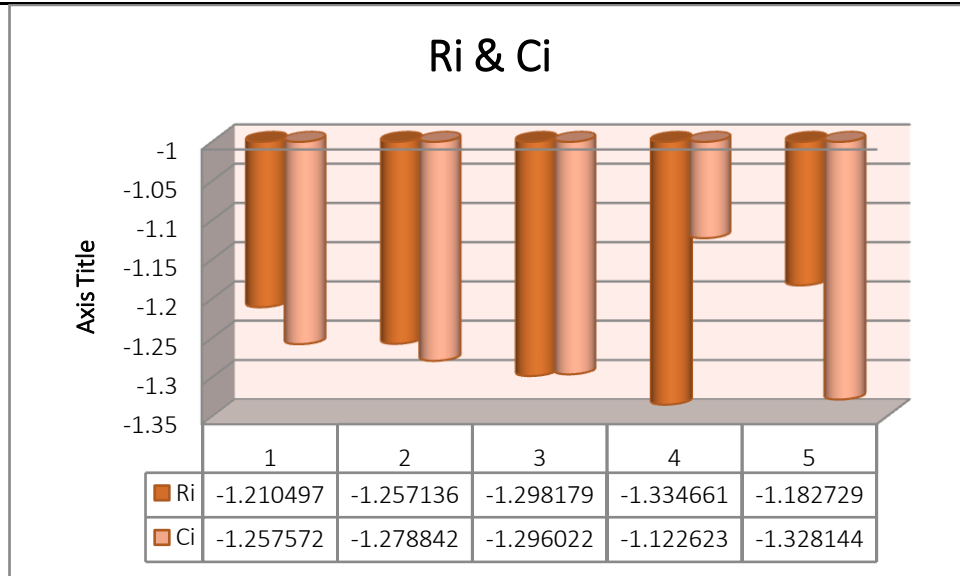
Total Relation matrix (T)				
-0.66347	-0.17264	-0.160813495	-0.0678	-0.14578
-0.16756	-0.69899	-0.166692138	-0.07018	-0.15371
-0.17116	-0.16219	-0.731865343	-0.07228	-0.16069
-0.17436	-0.16651	-0.160167452	-0.66673	-0.16689
-0.08103	-0.07852	-0.076483852	-0.24564	-0.70106

Table 8 shows that the total relation matrix the direct relation matrix is multiplied with the inverse of the value that the direct relation matrix is subtracted from the identity matrix.

**TABLE 9. Ri & Ci**

Ri	Ci
-1.2105	-1.25757
-1.25714	-1.27884
-1.29818	-1.29602
-1.33466	-1.12262
-1.18273	-1.32814

Table 9 shows the Ri, Ci Value in Propene (C<sub>3</sub>H<sub>6</sub>), Butene (C<sub>4</sub>H<sub>8</sub>), Pentene (C<sub>5</sub>H<sub>10</sub>), Hexene (C<sub>6</sub>H<sub>12</sub>), Heptene (C<sub>7</sub>H<sub>14</sub>)



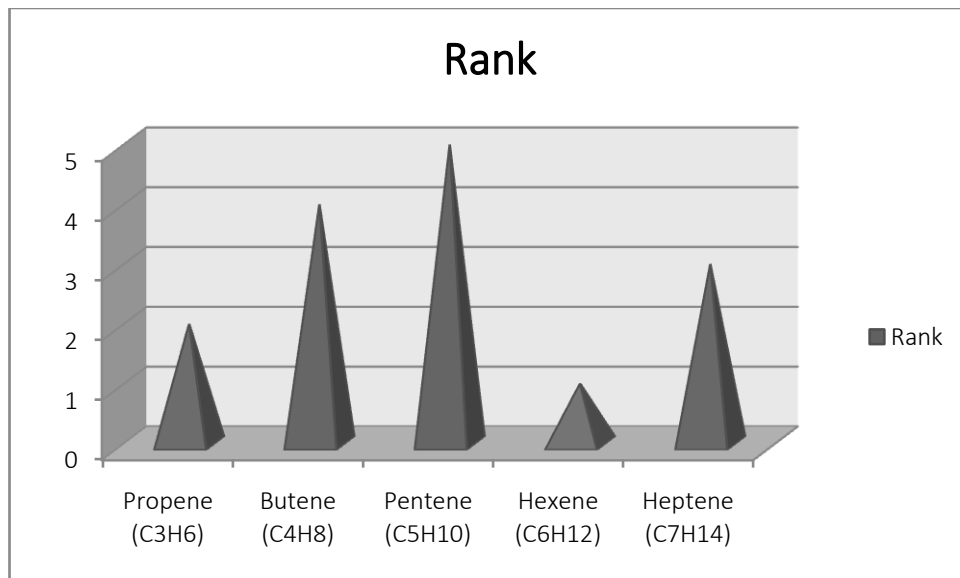
**FIGURE 2.** Ri & Ci

Figure 2 shows the Ri, Ci Value in Propene (C<sub>3</sub>H<sub>6</sub>), Butene (C<sub>4</sub>H<sub>8</sub>), Pentene (C<sub>5</sub>H<sub>10</sub>), Hexene (C<sub>6</sub>H<sub>12</sub>), Heptene (C<sub>7</sub>H<sub>14</sub>)

**TABLE 10.** Ri+Ci & Ri-Ci & Rank & Identity

Ri+Ci	Ri-Ci	Rank	Identity
-2.46807	0.047075	2	cause
-2.53598	0.021706	4	cause
-2.5942	-0.00216	5	effect
-2.45728	-0.21204	1	effect
-2.51087	0.145416	3	effect

Table 10 shows the Calculation of Ri+Ci and Ri-Ci to Get the Cause and Effect. the final result of this paper the Propene (C<sub>3</sub>H<sub>6</sub>), is in 2<sup>nd</sup> rank cause, Butene (C<sub>4</sub>H<sub>8</sub>) is in 4<sup>th</sup> rank cause, Pentene (C<sub>5</sub>H<sub>10</sub>) is in 5<sup>th</sup> rank effect, Hexene (C<sub>6</sub>H<sub>12</sub>) is in 1<sup>st</sup> rank effect and Heptene (C<sub>7</sub>H<sub>14</sub>) is in 3<sup>rd</sup> rank effect. The final result is done by using the DEMATEL method.



**FIGURE 3.** Rank

Figure 3. shows the graphical representation the final result of this paper the Propene (C<sub>3</sub>H<sub>6</sub>), is in 2<sup>nd</sup> rank, Butene (C<sub>4</sub>H<sub>8</sub>) is in 4<sup>th</sup> rank, Pentene (C<sub>5</sub>H<sub>10</sub>) is in 5<sup>th</sup> rank, Hexene (C<sub>6</sub>H<sub>12</sub>) is in 1<sup>st</sup> rank and Heptene (C<sub>7</sub>H<sub>14</sub>) is in 3<sup>rd</sup> rank.

**TABLE 11.** T matrix

T matrix				
-0.66347	-0.17264	-0.16081	-0.0678	-0.14578
-0.16756	-0.69899	-0.16669	-0.07018	-0.15371
-0.17116	-0.16219	-0.73187	-0.07228	-0.16069
-0.17436	-0.16651	-0.16017	-0.66673	-0.16689
-0.08103	-0.07852	-0.07648	-0.24564	-0.70106

Table 11 shows the T Matrix Value calculate the average of the matrix and its threshold value ( $\alpha$ )= Alpha - 0.251328180192954 If the T matrix value is greater than threshold value then bold it.

## 5. Conclusion

From the result it is seen that Hexene (C<sub>6</sub>H<sub>12</sub>) is got the first rank where as is the Pentene (C<sub>5</sub>H<sub>10</sub>) is having the lowest rank. DEMATEL-Entropy-TODIM to rank alternative sites the method is also used. Dematel times, entropi Weight method and TODIM method are different MCDM although widely used for problems, for us As far as known, all these three decision methods are LSWF are integrated and used for research. Demonstrate relationships between factors and the type and basis of relationships of their effects on each other's criteria Prioritize intensity. In addition, hybrid the most advantage of Fuzzy DEMATEL is that considering the degree of ambiguity, It is also about dealing with ambiguity flexibly. However, the DEMATEL instrument interscales Expresses relationship and type of relationships and Based on a critique of their implications gives priority. ISM is their bias and driving force Creates relationships through, but not through significance The first catalyst Reaction conditions are bulky groups and meta and electron withdrawal in para states and Donor groups are. However, ortho-substitution The use of alkynes made is not reactive, Presumably for serious reasons. Significantly, In each case only the Z isomer is given, Also no E isomer was observed. A new basis leading to high synthetic efficiency of current interest in developing reactions In the light, carboxylic acid chlorides in water forming direct coupling with terminal alkynes Very desirable. However, carboxylic acid Halides are very water sensitive Common sense

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