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| **Experimental Study of a ABC Ship Squat in Shallow Water**  Mohd Saja, Mohammad abc\*  Institut Maritim Jawa Tengah, Pekalongan, Indonesia  Center of Excellence in Hydrodynamics & Dynamics of Marine Vehicles, Sharif University of Technology, Tehran, Iran | | | \*Corresponding author  abc@sharif.edu | |
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| **Graphical abstract** | | **Abstract**  Over recent years, there has been an explosive growth of interest in the development of novel gel-phase materials based on small molecules. It has been recognised that an effective gelator should possess functional groups that interact with each other via temporal associative forces. This process leads to the formation of supramolecular polymer-like structures, which then aggregate further, hence gelating the solvent. Supramolecular interactions between building blocks that enable gel formation include hydrogen bonds, interactions, solvatophobic effects and van der Waals forces.  *Keywords*: Dendritic gels; tunable materials | | |
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**1.0 INTRODUCTION**

Please write your introduction here [1]. It has been recognised that an effective gelator should possess functional groups that interact with each other via temporal associative forces. This process leads to the formation of supramolecular polymer-like structures [2] which then aggregate further, hence gelating the solvent. Supramolecular interactions between building blocks that enable gel formation include hydrogen bonds, interactions, solvatophobic effects and van der Waals forces [3]. Recently, great emphasis has been placed on ways in which the structure of the gelator. The effect of molar concentration on the *thermally reversible gel-sol phase transition* (*T*gel) was monitored using the tube inversion technique [11]. The validity of this approach, and the reversibility of the phase transition, was checked with differential scanning calorimetry. As the molar concentration of the dual components as shown in Table 1.

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**Table 1** Catalytic alkylation of resorcinol to 4-*tert*-butyl resorcinol and 4,6-di *tert*-butyl resorcinol a

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| --- | --- | --- | --- | --- | --- | --- |
| **Entry** | **Catalysts** | **Conversion / %** | **Product yield / mmol** | **Selectivity / %** | | **Ratio of Lewis acid to Brönsted acid b** |
| **4-*tert* butyl resorcinol** | **4,6-di *tert*-butyl resorcinol** |
| 1 | MA | 0 | 0 | 0 | 0 | 0 |
| 2 | 3%Ga-BEA | 38.0 | 15.6 | 97.4 | 2.6 | 0.5 |
| 3 | 8%Ga-BEA | 54.4 | 21.7 | 95.8 | 4.2 | 0.7 |
| 4 | 10%Ga-BEA | 59.1 | 23.6 | 100 | 0 | 1.0 |
|  |  |  |  |  |  |  |

aAll reactions were carried out at 80 °C for 8 h with resorcinol (40 mmol), MTBE (60 mmol) and catalyst (0.2 g) with vigorous stirring.

bThe ratio of Lewis acid to Brönsted acid is calculated by using the peak area of peaks at wavenumber of 1540 cm-1 and 1450 cm-1 for Brönsted and Lewis acids, respectively (see Figure 1).

cThe amount of H2SO4 is 25 mol.

dThe MA in a solution containing H2SO4. The amount of MA and H2SO4 are similar as entries 1 and 6, respectively.

**2.0 EXPERIMENTAL**

In a two-component gel, it is easy to modify the molecular structure of either of the two components.

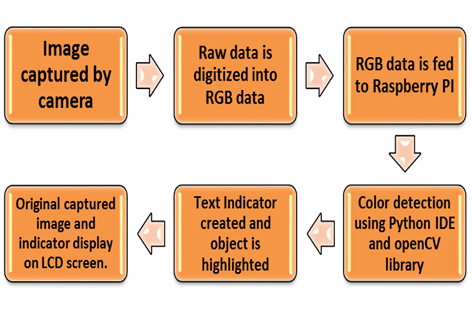
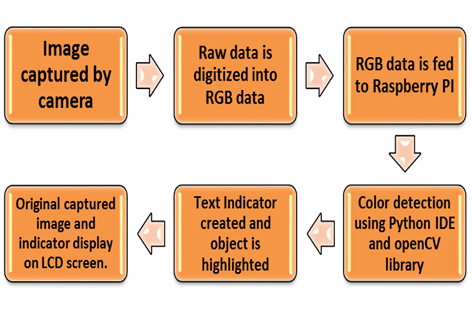
**3.0 RESULTS AND DISCUSSION**

**3.1 Full Hardware Setup**

The whole system is setup by connecting the PI camera module to the CSI port on the Raspberry PI board via ribbon cable while the LCD screen is connected to the board via HDMI cable. The wireless keyboard and mouse is connected to the board using wireless USB adapter. This is only needed when manipulation of code is required. The power is supplied to the board by connecting a micro USB to USB cable to a wall socket USB adapter or power bank.

**3.2 Object Highlighting**

The second part of the application is highlighting the regions, which have the same HSV value as the centre of the circle. In coding aspect, two thresholds are used for the filtering process. The low threshold is an array which contains the minimum of the HSV value whereas the high threshold holds the maxima of HSV value. Figure 1 shows the color benchmark, which consists of 10 different colours such as black, yellow, orange, green, purple, pink, cyan, blue, grey and red. It also have different shapes according to the color and have different sizes of sphere for red color. The prototype color detection assistive device, for experimental purposes only detects 4 base colours and HSV within its range. Besides the HSV range, the result will display unknown or not detected.

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**Figure 1** Block diagram of the processes of the system

**4.0 CONCLUSION**

The nature of the aggregates present in dilute solution, below the gelation threshold concentration, was investigated using atomic force microscopy (AFM). When the two components were present in a 2:1 (dendrimer:diamine) ratio, rod like aggregates were observed in the AFM The length of these rods was approximately 100 nm, and their diameters were ca. 9 nm (depth ca. 1 nm).

The characteristics and type of color blind has been studied and identified as well as the problem faced by individual that is color blind. A real-time color recognizing system using image processing technique is successfully developed and tested.

A various experiments were performed to test the functionality of the developed application for color deviation and range tests. For the color deviation test, the results showed the deviation on the HSV value of the tested color was small and within an acceptable ranges. The results of the range test showed that the device could recognize color from a range of 20 cm up to 12 m.

In conclusion, this prototype is able to recognize up to four colours such as red, blue, green and yellow as well as their respective variations such as light blue or dark blue. The region with similar HSV value to the designated region is also highlighted. The visual results which is text indicating the object color as well as the boundary line is successfully shown on the LCD monitor. The result of the distance test shows that the hue (H) element is almost consistent whereas the saturation (S) varies by roughly 49.3% and value (V) by 30.5%. As for the range of detection, the minimum range is 12 cm where the maximum range is up to 15 meter. The accuracy of the 4 base colors detection is about 80%.

**Acknowledgement**

We are grateful for the UTM scholarship to Author 1.

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