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Photonic crystal cavity mediated improved absorptive nonlinearity of C-4-hydroxy-3-methoxphenilcalix[4]resorcinarene

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Synthesis of C-4-hydroxy-3-methoxphenilcalix[4]resorcinarene (34%, 4.1696g) was done with 1:1 resorcinol and vanillin by the acid-catalyzed reaction. Resorcinol (0.05 mol, 5.505 g) and vanillin (0.05 mol, 7.6075 g) were ground together by mortar and pestle in the presence of p-toluene sulfonic acid (5%, 0.025 mol, 0.4305 g)[1,2]. The reactants melted on grinding and solidified after 1 hour. The product was washed with water, filtered, and recrystallized from methanol.

NMR of C-4 -hydroxy-3-methoxphenilcalix[4]resorcinarene

1 H NMR spectral data Signals around 6.20 ppm in DMSO-d 6 solvent belong to resorcinol's aromatic protons. The methine protons resonate as a singlet in the 5.52-5.63 ppm range, while phenolic protons resonate in the 8.41-8.70 ppm range. Due to a spin-spin coupling, phenyl ring protons resonate doublets in the 6.12-7.14 ppm range. 1 HNMR could not observe the internal aromatic protons in the cavity due to ring current effects. As expected, two isomers, C_{4v} and $C_{2v,}$ were present in the 1 H NMR spectra[Fig.1], and due to the presence of two isomers, some of the peaks were merged.

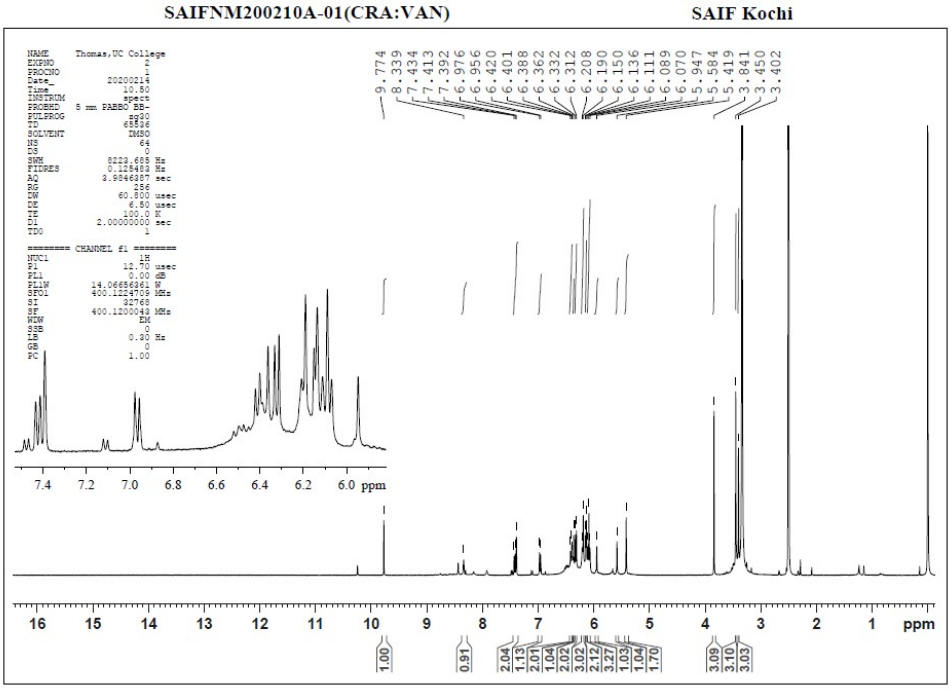

Fig.1 NMR spectrum of CHMPCR

1HNMR in DMSO-d6(δ values):C4v: 5.58 (s, 2H, CH), 9.77(s, 1H, OH), 7.43 (s, 2H, OH) C2v: 5.42(s, 2H, CH), 8.39 (s, 1H, OH), 7.44(s, 1H, OH); C4v and C2v:3.40 (s, 3H, OCH3), 3.45(s, 3H, OCH3), 3.84 (s, 3H, OCH3),6.07-6.97(m, 10H, Ph)

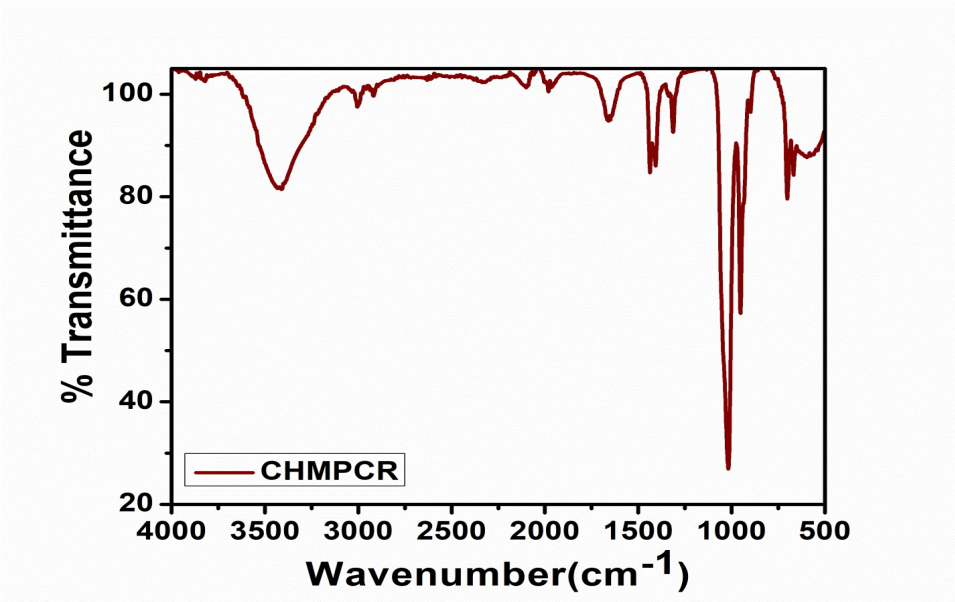

Fig.2: FTIR spectrum of CHMPCR

The chemical bonds in the molecule are identified with Fourier transform infrared (FTIR) spectroscopy (Jasco FTIR-4700). FTIR spectrum of CHMPCR from 500 to 4500 cm^{-1} is shown in Fig.2 to identify the functional groups present. The characteristic peaks of CHMPCR are consistent with the FTIR spectrum reported in the literature[3]. They are as follows: 3425 cm^{-1}(stretching of OH bond), 2995 cm^{-1}(stretching CH sp^3), 1657 cm^{-1}(stretching of C=C aromatic rings), and 1393 cm^{-1} (bending CH sp^3).

References

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3 R. E. Sardjono, A. Kadarohman and A. Mardhiyah, *Procedia Chem.*, 2012, **4**, 224–231.