



Green Synthesis, Physicochemical, Optical and Antibacterial Activity Studies of Two Novel Organic Molecular Complexes of 2-Chloro-4-Nitrobenzoic Acid

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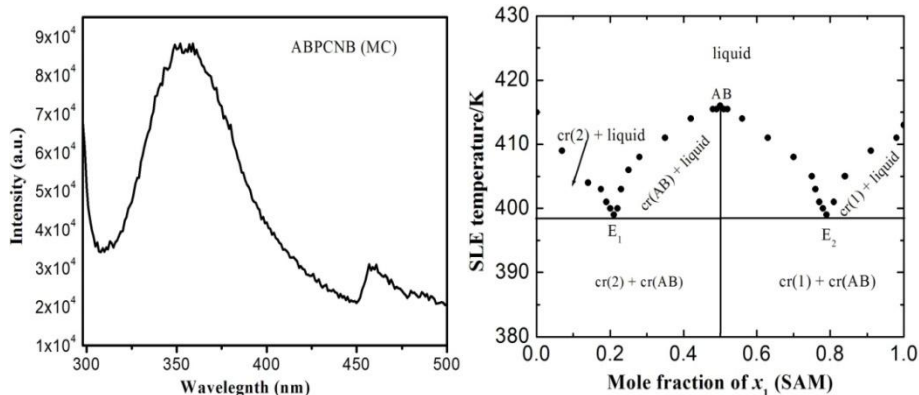
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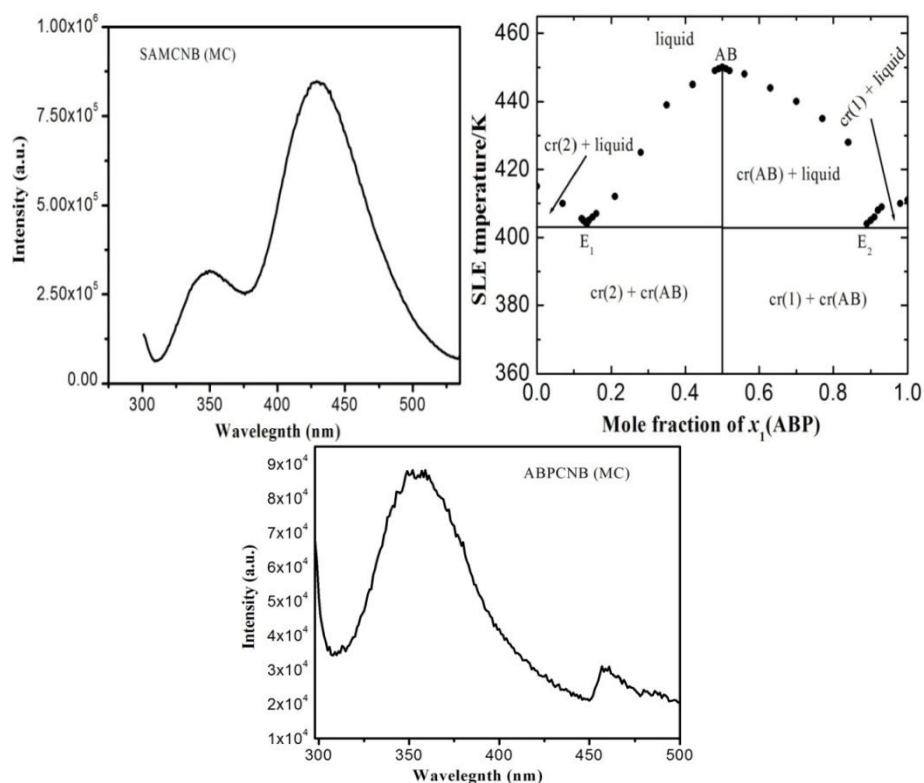
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ABSTRACT

Two novel organic complex compounds were synthesized via solid – liquid equilibrium investigation of organic systems; 2-chloro-4-nitrobenzoic acid – 2-hydroxybenzamide and 2-chloro-4-nitrobenzoic acid – 2-amino-5-bromopyridine and obtained their phase diagrams. In both the cases, their phase diagram study showed that the formation of a complex compound in 1:1 molar ratio with congruent melting temperature. The DSC Thermograms of SAMCNBA and ABPCNBA molecular complexes exhibited a melting temperature endotherm at 416 K and 451 K, respectively. The thermal behaviour of molecular complex has also been studied using TGA method. Spectral studies have supported the formation of complex compounds. The PXRD of SAMCNBA and ABPCNBA provide further support for formation of new compounds which are entirely different from their starting components. Both SAMCNBA and ABPCNBA are fluorescence. The excess thermodynamic functions have been computed. The antibacterial study of both the materials has been shown moderate bacterial growth inhibition activity. SAMCNBA shows the good antibacterial activity against *E. Feacalis* and *P. fluorescence* bacteria.

Graphical Abstract:





Highlights

- Two novel organic molecular complexes (SAMCNBA and ABPCNBA) have been synthesized.
- Both molecular complexes have been formed in 1:1 molar ratio of its component.
- Melting point of SAMCNBA and ABPCNBA have been found 416 K and 451 K, respectively.
- SAMCNBA and ABPCNBA complexes show the better emission properties.
- SAMCNBA and ABPCNBA show the good antibacterial activity against the growth of gram positive bacteria *E. faecalis*, MIC values 12.20 $\mu\text{g mL}^{-1}$.
- SAMCNBA shows the good antibacterial activity against both gram positive bacteria (*E. faecalis*) and gram negative (*P. fluorescence*)..

Keywords: Solid- liquid equilibrium, thermal property, powder X-ray diffraction, optical property, antibacterial activity.