

## Separation of Lutidine Isomers by Selective Enclathration

Jacky S. Bouanga Boudiombo<sup>1</sup>, Hong Su<sup>1</sup>, Neil Ravenscroft<sup>1</sup>, Susan A. Bourne<sup>1</sup>, Edwin Weber<sup>2</sup>,  
and Luigi R. Nassimbenia<sup>1</sup>

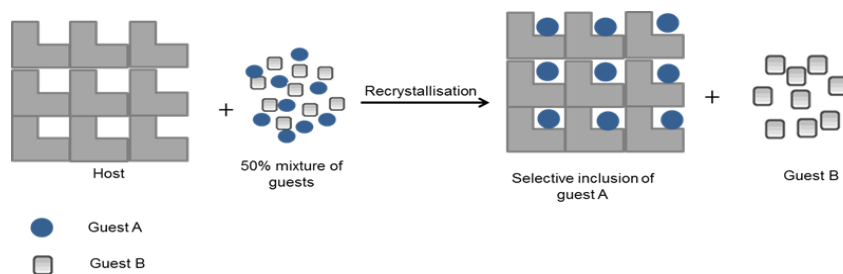
<sup>1</sup>Centre for Supramolecular Chemistry Research, Department of Chemistry, University of Cape Town, Rondebosch 7701, South Africa,

<sup>2</sup>Institut für Organische Chemie, TU Bergakademie Freiberg, Leipziger Straße 29, D-09596 Freiberg/Sachs, Germany

\* luigi.nassimbeni@uct.ac.za

Molecular selectivity by host-guest procedures is an increasing method to help in the separation of isomers<sup>1</sup>. The separation of a component from a mixture may be carried out by exploiting the physico-chemical properties of the compounds in that mixture. The most common techniques, viz. distillation, crystallization, liquid-liquid extraction, and various forms of chromatography, rely on differences in solubility and vapor pressure of the components. In the case of molecular isomers, however, their macro-properties are often similar, rendering the traditional separation techniques inefficient. In such cases the process of enclathration by a suitable host compound is a useful technique.<sup>2,3,4</sup>

In this study, the host compound 3,3'-bis(9-hydroxy-9-fluorenyl)-2-2'-binaphthyl, H1, has been employed to separate the six isomers of lutidine. Competition experiments showed that the preference for enclathration is in the sequence 3,4-LUT > 2,6-LUT > 2,3-LUT > 2,5-LUT > 2,4-LUT ≈ 3,5-LUT. The structures yielded results that agree with the <sup>1</sup>H NMR analyses and with the thermal analysis. The effects of mixed hosts and vapor-phase competitions were briefly explored with two extra hosts, namely, 2,2'-bis(1-hydroxy-4,5-dihydro-2,3,6:7-dibenzocycloheptadien-1-yl)biphenyl (H2) or 3,3'-bis(di-p-olyhydroxymethyl)-1,1'-binaphthyl (H3). Following this study, 2,2'-bis(1-hydroxy-4,5-dihydro-2,3,6:7-dibenzocycloheptatrien-1-yl)-biphenyl, H2, was then employed to discriminate between all the pairs of lutidine isomers. The preference for guest enclathration follows the sequence 3,4-LUT > 2,4-LUT ≈ 3,5-LUT > 2,5-LUT > 2,3-LUT > 2,6-LUT. This has been confirmed by guest-release endotherms measured by DSC. Four extra diol host compounds with similar structures were tested on pairs of lutidine isomers which were poorly separated by H2.



**Figure 1.** Molecular chemistry by host-guest chemistry.

**Keywords:** Dio-hosts, separation, lutidine isomers

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