SERS STUDIES OF SYNTHETIC STRUCTURAL ANALOGUES OF THE DYE INDIGO

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Abstract: The SERS spectral profiles of eleven synthetic structural analogues of the dye molecule indigo have been obtained. An analysis of structure-spectral profile correlations together with a brief comparison of the vibrational band profiles attained by FT-Raman and dispersive Raman using powdered samples will be given.

Indigo [1] and structurally related dye molecules e.g. indigo carmine [2] are of significant contemporary commercial and intrinsic scientific interest. In an attempt to gain a more detailed understanding of both the chemical and vibrational spectroscopic properties of the aforementioned dye molecules eleven structurally related compounds have been synthesised (examples of the synthetic molecules are shown in Fig. 1) and their SERS profiles obtained using a silver sol [3] as the SERS substrate.

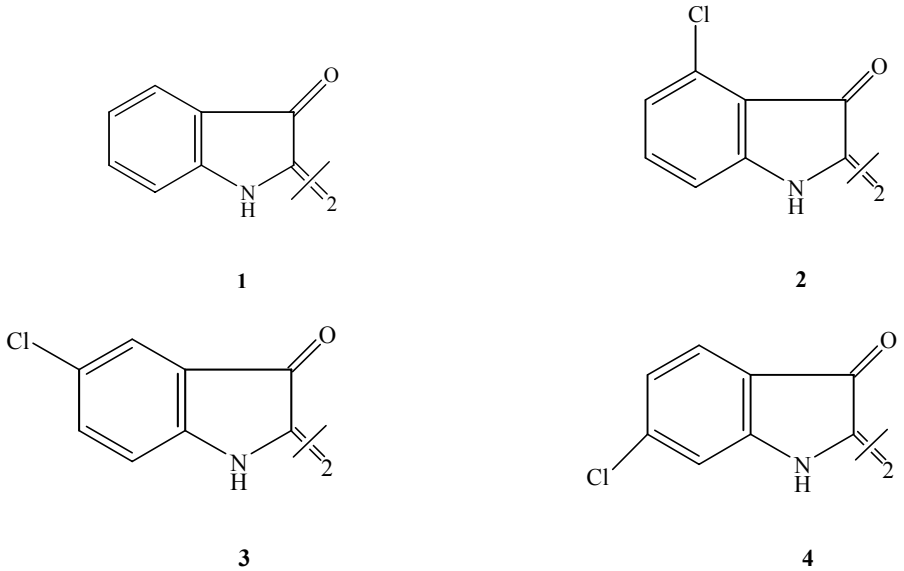

Fig. 1. Schematic chemical structures of indigo (**1**) and three of the eleven structural analogues.

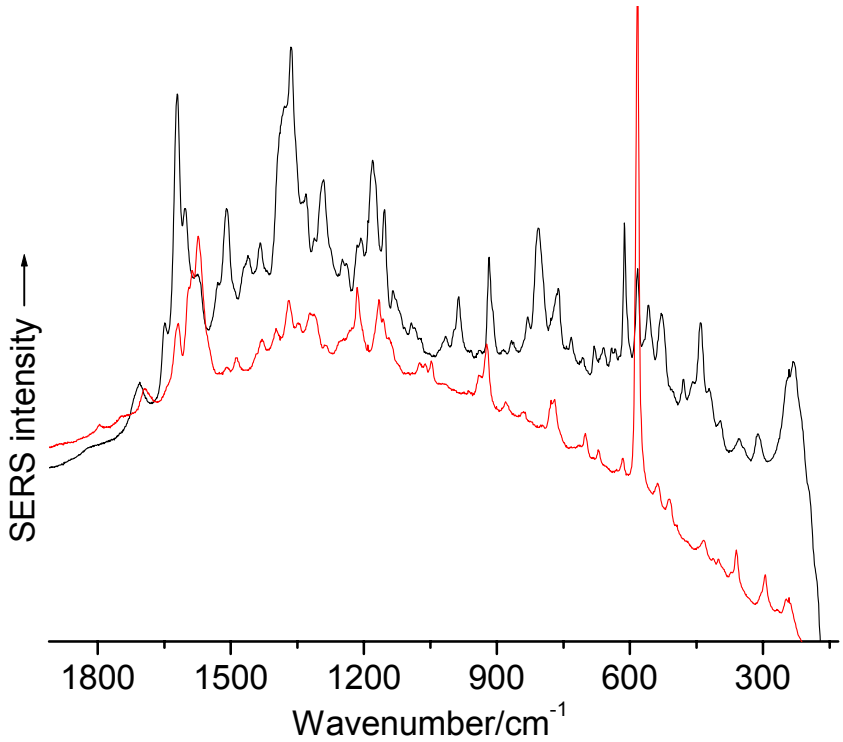

Fig. 2. SERS spectra of indigo (black) and molecule **2** (red; a chloro derivative of indigo).

A comparison of the SERS profile obtained using a laser excitation wavelength equal to 632.8 nm and a silver sol as the SERS substrate is shown in Fig. 2. Although there are similarities in the wavenumbers of the vibrational bands between the two structurally related molecules, there are also very significant differences. The aforementioned differences together with the SERS spectra of the other ten synthetic indigo analogues will be presented and discussed.

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