



An absorption spectroscopic investigation of the interaction of lac dyes with metal ions

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Abstract

As part of an investigation on mordants and lac dyeing of silk and cotton, UV–VIS spectroscopic studies were carried out on the effect of pH and metal ions on Thai lac dye extracted from stick lac from the Rain tree in northeast Thailand. These results were compared with those from commercial lac dye (Wako Company), and from laccic acids A and B. It was shown that increasing the metal ion concentration caused a bathochromic shift of the lac dye absorption bands in the visible region in both the laccic acids A and B and the dyes. Also when the pH of the lac dye solution was increased from 2.5 to 11, a substantial bathochromic shift of the lac dye visible absorption band was observed in both Wako and Thai lac dyes. At alkaline pH, the phenolic hydroxyl (and carboxylic acid groups) in lac dye molecules is deprotonated, resulting in a pronounced bathochromic shift. The study also indicated that when the concentration of metal salts increased within the range of concentrations studied, the intensity of the long wavelength absorption band of laccic acid A, laccic acid B and commercial lac dye increased accordingly.

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