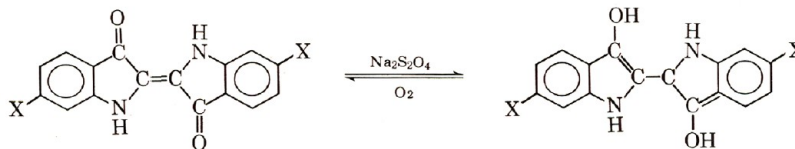


**Figure 4.** FTIR spectra of dyes on KBr powder  
(a) synthetic 6,6'-dibromoindigotin and (b) synthetic indigotin

behavior. Indigoid materials dissolve in alkaline sodium hydrosulfite solution as the almost colorless leuco base and are reprecipitated when such solutions are exposed to air (oxygen). The chemistry of the leuco base reactions is:



The reactions are characteristic of the vat dye family of which indigotin and 6,6'-dibromoindigotin were the only known members in antiquity.

The halogenated indigoids, such as 6,6'-dibromoindigotin, dehalogenate to indigotin when their leuco base solutions are exposed to UV radiation (daylight and fluorescent light). In the case of the above compound, this dehalogenation is accompanied by a color change in the oxidized form from purple to blue.

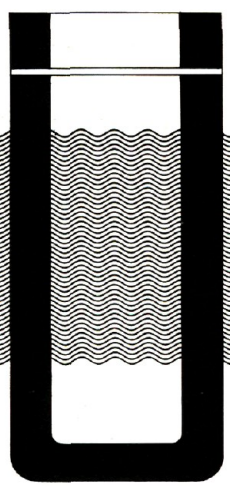
A sherd ~6 mm in diameter with purple deposit was placed on filter paper on a hot plate and observed under low-power magnification. It was heated to 60–80 °C, and alkaline hydrosulfite solution at about the same temperature was dropped onto the purple surface at a rate that produced some overflow. When a change in the color intensity was observed, the filter paper directly under the sherd was examined and found to have a small purple spot. As the filter paper remained exposed to daylight and fluorescent light on the laboratory bench, the spot spread slightly and turned blue. Leuco base of 6,6'-dibromoindigotin, which had not yet oxidized back to the dye, had undergone photodebromination, which is characteristic of halogenated indigoids. The chemical behavior of the deposit confirms the conclusions drawn from the IR spectra that the



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