

The DSC monitoring of oil melting to follow the oil curing

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The drying of an oil paint is due to the polyunsaturations of the oil in the binder. Polyunsaturated oils dry through an autoxidation process in which the double bonds of linolenic and linoleic acids naturally react with the oxygen present in the atmosphere. The gradual conversion of the liquid oil through a soft gel to a rubbery solid occurs as a result of a multistep free radical chain reaction. During the propagation step, hydroperoxides are formed.[1] A method frequently used to follow the oil curing is the DSC monitoring of the peroxide decomposition peak during time. [2, 3, 4]. Since the oil polymerization affects its crystallinity, we propose here an alternative method to assess the oil curing. The melting peak of linseed oil samples is measured at different times of curing and compared with the profile of the peroxide decomposition peak over time. The comparison shows that the two phenomena are strongly correlated and that, when the maximum of the peroxide content is reached, the melting peak disappears. The study of the DSC melting peak is therefore proposed as a valid alternative tool to monitor the curing of an oil paint.

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