

# The use of Fast DSC for the formation of new meta-stable states in Catechol

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Differential Scanning Calorimetry (DSC) has been used to study the thermodynamic properties of many materials by cooling and heating at different rates. However, most standard DSC instruments have a maximum cooling and heating rate of 60-100 K/min only. Recently, a new technique called Fast DSC was developed that allowed cooling and heating rates of up to 50000 K/s. This allows the study of meta-stable states of different systems by cooling or heating at large rates. Such technique was used in Catechol (1,2-dihydroxybenzene) where upon heating at 1000 K/s from a glass state, a new short lived meta-stable state was discovered. It was found that, below a heating rate of 1000 K/s, the system transitioned from its glass state to the room temperature stable solid state. However, at higher heating rates, a new meta-stable state is formed with a lower melting point than the stable solid state. This is in stark contrast to Resorcinol (1,3-dihydroxybenzene), where no new states were observed even with heating rates of up to 10000 K/s.