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Temperature and Pressure Dependence of the Glass to Liquid Transition in Ferrocene/Dibutylphthalate	SC-243

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"Nuclear Resonant Scattering of Synchrotron Radiation for the Study of Dynamics around the Glass Transition"

Abstract:
Motion of ^{57}Fe can be observed on a scale of nsec to μsec through the nuclear resonant forward scattering of synchrotron radiation. Additional information is obtained by measuring simultaneously incoherent nuclear resonant scattering at nonzero angles. In a glass, one measures the Lamb-Mößbauer factor; in the viscous phase, structural relaxation is observed directly. We apply the method to ferrocene / dibutylphthalate between 140 and 205K. The mean relaxation times do not follow the observed temperature dependence of other, macroscopic relaxation measurements. We attribute this to a strong wavenumber dependence of the relaxation time. The prospects of nuclear resonant scattering for studying the dynamics of viscous liquids are discussed.