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# A Synchrotron Infrared Absorption Study of Pressure Induced Polymerization of Acrylamide

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## *Abstract:*

The hydrogen bonded dimeric structure of the model amide based molecular crystal acrylamide has been investigated under pressure using micro-spectroscopy, employing synchrotron infrared radiation up to 24 GPa at room temperature. The high pressure spectra indicate systematic evolution of new features above 4 GPa, which have been identified to be due to the emergence of a polymeric phase. The polymerization gets completed up to 16.8 GPa and the observed changes are found to be irreversible upon the release of pressure. The behavior of N-H stretching modes indicate that the uniform inter- and intra- dimeric interactions, rather than depicting a drastic reconstruction across the phase transition, show subtle modifications and become diverse in the high pressure polymeric phase.

*Keywords:* High pressure; infrared; spectroscopy; synchrotron; Acrylamide; dimer; N-H---O hydrogen bonds

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