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Effect of shear stress on the high-pressure behaviour of nitromethane: Raman spectroscopy in a shear diamond anvil cell PHILIPPE HEBERT, AUDE ISAMBERT, CEA, DAM, Le Ripault, JEAN-PIERRE PETITET, ANDREAS ZERR, Universite Paris-Nord — A detailed description of the reaction mechanisms occurring in shock-induced decomposition of condensed energetic materials is very important for a comprehensive understanding of detonation. Besides pressure and temperature effects, shear stress has also been proposed to play an important role in the initiation and decomposition mechanisms. In order to study this effect, a Shear Diamond Anvil Cell (SDAC) has been developed. It is actually a classical DAC with the upper diamond anvil rotating about the compression axis relative to the opposite anvil. In this paper, we present a Raman spectroscopy study of the effect of shear stress on the high-pressure behaviour of nitromethane. Two major effects of shear stress are observed in our experiments. The first one is a lowering of the pressures at which the different structural modifications that nitromethane undergoes are observed. The second effect is observed at 28 GPa where sudden decomposition of the sample occurs just after shear application. Observation of the sample after decomposition shows the presence of a black residue which is composed of carbon as indicated by the Raman spectrum. [1] Manaa, M. R., Fried, L. E., and Reed, E. J., *Journal of Computer-Aided Materials Design*, 10, pp 75-97, 2003.

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