Abstract Submitted for the SHOCK13 Meeting of The American Physical Society

Single walled carbon nanotubes at ultra-high pressure/stress MAXIME NOEL, MATTIAS MASES, Division of Physics, Department of Engineering Sciences and Mathematics, Luleå University of Technology, SE-97187, Luleå, Sweden, ALEXANDER V. SOLDATOV¹, Division of Physics, Department of Engineering Sciences and Mathematics, LuleåUniversity of Technology, SE-97187, Luleå, Sweden — We report on the first study of single walled nanotubes (SWCNTs) synthesized by HiPCO method under pressure/stress up to 70 GPa aimed at probing structural stability of small diameter SWCNTs and synthesis of new nanostructured carbon phases. Firstly, the material has been exposed to 25 GPa. Raman spectra of the recovered of material exhibited extremely high defect density and evident recovery of the radial breathing mode (RBM) band with some intensity profile alteration. Secondly, the material was pressurized subsequently to 70 GPa followed by a relatively fast pressure release. Raman characterization provides indications of a transformation of the material to a new structural state as the result of the second pressure cycle. We discuss the structural evolution of the system en-route the final structure which is presumably comprised of deformed graphene nanoribbons and/or polymerized CNTs in addition to the smallest diameter SWCNTs which survived ultra-high pressure/stress.

¹Other affiliation: Department of Physics, Harvard University, Cambridge, MA-02138, USA / Corresponding author: Alexander.Soldatov@ltu.se

Maxime Noël Division of Physics, Dept of Engineering Sciences and Mathematics, Luleå University of Technology, SE-97187, Luleå, Sweden

Date submitted: 14 Feb 2013

Electronic form version 1.4