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Properties of the pressure-induced extended-solid carbon monoxide under different synthesis and processing conditions NHAN DANG, JENNIFER CIEZAK-JENKINS, Army Research Laboratory, USA — The discovery of the high-energy-density pressure-induced extended-solid/polymeric carbon monoxide (poly-CO) has opened a new paradigm of energetic materials. Considerable studies have been made to understand properties of poly-CO. However factors which control the morphology and meta-stability of recovered samples at ambient conditions have not been identified. In this presentation, we report the variations of morphology and meta-stability of poly-CO synthesized under different conditions in the GPa range. It has been found that the morphology and meta-stability of poly-CO depend on sample volume, rate of polymeric phase transition and additives. Poly-CO synthesized with a faster compression rate appears to be more structurally disordered and have higher rates of decomposition. Samples synthesized in a larger volume require either a longer time at elevated pressure or a higher pressure for the polymeric phase transitions to occur. Also, results of kinetic studies of photochemical reaction of CO at 4.5 GPa in presence of traces of H₂O, HCl (1M), and concentrated H₂SO₄ will be presented and influences of these additives on the morphology and meta-stability of polymeric CO will be discussed.

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