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Pressure-induced structural transformations of 1D nanostructured TiO₂ YANG SONG, ZHAOHUI DONG, ANKANG ZHAO, University of Western Ontario — Nanostructured materials especially semiconductors in different morphologies such as dots, wires, belts and tubes are of fundamental importance because of their wide range of tunable electrical, optical and mechanical properties. Investigations of the structures and phase transformations of nanomaterials under high pressures have received increasing attention. This is because, in addition to composition and synthetic routes, high pressure provides an additional effective driving force to produce new structures and, therefore, new nanomaterial properties. Using vibrational spectroscopy and synchrotron X-ray probes, in particular, we have studied several nanostructured TiO₂ materials under high pressure in situ to explore their high-pressure behaviors in terms of transformation pressures, phase stability regions and compressibility. Interesting size dependent phase transitions were observed in all those nanomaterials comparing with the corresponding bulk materials.

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