

Abstract Submitted
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Attempts in PTTT diagram of pressure induced phase transformations¹ S.M. HONG, X.R. LIU, L.Y. CHEN, Z. HE, D.D. ZHANG, M.Y. WANG, C.R. ZHANG, Laboratory of High Pressure Physics, Southwest Jiaotong University, China — Temperature-time-transition (TTT) diagram is widely applied for understanding the kinetic behavior of temperature induced phase transition. In contrast to it, kinetic behavior of pressure induced phase transitions is still not effectively researched, although many equilibrium phase diagrams have been found up to very high pressure. In fact, behavior of diamond nucleation and growth from C-H-O system could be well known through characterization of recovered samples. The results suggest time-dependent conditions of pressures and temperature. A notional kinetic phase diagram is established by previous experimental and geological data. In recent years, we made a pressure-jump apparatus with the compression rate from several to 500GPa/s within 10GPa, such rate range lies in the gap between conventional static and dynamic high pressure experiments. By using it, some novel metastable phases were solidified through rapid compressing their melts, including alloys, non-metallic elements and polymers. Comparing characterization of recovered phases with the experimental conditions, dependence of phase transition on the compression rates could be clearly demonstrated, furthermore, combining with heating or cooling rates at high pressure, the kinetic phase diagram with three dimensions, pressure, temperature and time, (PTTT diagram) could be established.

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