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A laboratory method for modeling synthesis of coesite in the earth's surface by combining local mechanical collision with shear stress and high static pressure. WEN-HUI SU, SHU-E LIU, Center for the Condensed-Matter Science and Technology, Harbin Institute of Technology, Harbin 150001, P. R. China, DA-PENG XU, WEI-RAN WANG, Center for Rare-Earth Solid State Physics, Jilin University, Changchun 130023, P. R. China, XIAO-MEI LIU, Center for the Condensed-Matter Science and Technology, Harbin Institute of Technology, Harbin 150001, P. R. China — A laboratory method of combining the high-energy mechanical ball milling and high static pressure has been suggested for modeling synthesis of coesite in the earth's surface. A window of milling time, a mechanical collision-induced intermediate phase of α-quartz and its condition of easily crystallizing into coesite induced by high static pressure 3.0 GPa, 923 K, < 1.0 min have been discovered. The condition has a much shorter synthesizing time and lower synthesizing critical pressure than that obtained before. The Raman spectrum for the coesite synthesized by the present method has the biggest number of peaks, and have covered over the information of those natural and synthesized coesite reported before. Here We clarify the implications of the coesite synthesized by this method in geo-science, and suggest another possible formation mechanism of coesite in the earth's surface, which is different from the hypothesis of plate subduction-exhumation in the earth that was based on the coesite formation condition of high static pressure in laboratory.

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