

# A Review of Research on a New Silica Polymorph-Moganite

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**Abstract:** Moganite is a polymorph of microcrystalline silica which was approved as a distinct and valid mineral species in 1999 by International Mineralogical Association's Commission on New Minerals and Mineral Names. This paper briefly reviewed the structure, thermal dynamics, physical and chemical properties and computer simulation of moganite. In addition unsolved issues in moganite were discussed and the scientific significance of the study on moganite was elaborated. Moganite was found to commonly coexist with varieties of microcrystalline quartz in evaporite and hydrothermal environments. High content H species were found in moganite existing in the form of free water and hydroxyl (about 2% - 4wt%), and the hydroxyl existed in the form of defect. Moganite has quite different physical properties comparing with other SiO<sub>2</sub> polymorphs. It has recently been found that moganite undergoes a structural phase transition from space group *I2/a* to *Imab* at the temperature of 570 K. The transition is proposed to be displacive and associated with soft modes, like the  $\alpha$ - $\beta$  phase transition in quartz. However, the transition mechanism is not fully consistent with the available experimental data. Whether moganite has a place in the phase diagram of SiO<sub>2</sub> remains unknown. In aspects of geology, moganite is considered as an indicator of evaporitic regimes, which may play an important role in the diagenesis. However, researches on the role moganite plays in minerals are still in primary stage. Though, moganite has been found in many SiO<sub>2</sub>-bearing minerals, and understandings of the role of moganite in minerals are competing. Gaining a better understanding of thermal dynamics and stability of moganite would be important for evaluating its role in geology process. However, these physical properties of moganite remain poorly studied.

**Keywords:** Moganite; SiO<sub>2</sub>; Structural Phase Transition; geological process