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# Cobalt-lithium stuffed quartz solid solutions by sol-gel synthesis

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## Abstract

Stuffed aluminosilicate quartz solid solutions (Qss) represent the main functional component of state-of-the-art zero-thermal-expansion glass-ceramics. For saving lithium resources, the possibility of lithium substitution is investigated. Therefore Qss in the CoO-Li<sub>2</sub>O-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>-system were prepared by sol-gel synthesis. Starting from Qss with spodumene composition (Li<sub>2</sub>O Al<sub>2</sub>O<sub>3</sub> 4 SiO<sub>2</sub>) lithium ions were substituted stepwise by cobalt ions. The as-received amorphous sol-gel materials were crystallized > 750°C and depending on cobalt concentration, Qss and/or spinel were detected by X-ray diffraction (XRD). Thermal expansion of Qss was measured in-situ by high-temperature XRD.

**Keywords:** Sol gel, thermal expansion, quartz solid solutions, lithium aluminosilicate, cobalt

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