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Meteoritic calcite oxygen isotope systematics – Tracing aqueous alteration of CM chondrites.

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Aqueous alteration of CM chondrites is evident from the presence of, e.g., calcite thought to have precipiated from fluids [1]. *In-situ* oxygen isotope data of calcite in CMs Maribo, Cold Bokkeveld, and Murchison allow to unravel formation processes on the CM primary accretionary rock or later brecciated CM parent body(ies). The oxygen isotope results obtained so far seem to support the continuous fluid evolution [2] with certain calcites tracking different precipitation events [3]. Following [2,3], Maribo calcite showing the highest $\delta^{18}O$ and $\delta^{17}O$ is an early precipitate from a more primitive fluid, while Murchison and Cold Bokkeveld calcite formed from a more evolved fluid. The brecciated nature of CM chondrites does not imply *in-situ* formation of calcite only. Further work combining petrography and isotopy is needed to distinguish the sequence of aqueous alteration, impact brecciation, and re-accretion of CM chondritic rocks and breccias.

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[1] Brearley, A. J. (2006) MESS II, 587-624. [2] Benedix, G. K. et al. (2003) GCA 67, 1577-1588. [3] Tyra, M. A. et al. (2012) GCA 77, 383-395.

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