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CM chondrite aqueous alteration – chemical and oxygen isotope constraints from calcite

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CM chondrites are breccias consisting of lithological units and matrix that show variable degrees of aqueous alteration mirrored by a highly complex mineralogy and chemistry (e.g., [1]). Carbonates have been shown to provide valuable constraints on, e.g., the chemical and isotopic evolution of the fluid altering CM chondrite material (e.g., [2-4]). We have undertaken a study of five CM chondrites (Maribo, Cold Bokkeveld, Murchison, Bantan, Nogoya) examining a total of 81 calcite grains *in situ* (EPMA, SIMS) in different lithological units for mineral chemistry and oxygen isotope systematics. This data is complemented with calcite replacement textures and chemistry, and the petrography of the calcite host lithology. Combined, the data set provides constraints on the location, timing, and conditions of CM chondrite aqueous alteration and the chronological relationship to CM brecciation.

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[1] Bischoff, A. et al. (2006) MESS II, 679-712. [2] Benedix, G.K. et al. (2003) GCA 67, 1577-1588. [3] Tyra M.A. et al. (2012) GCA 77, 383-395. [4] Lee M.R. et al. (2013) GCA 121, 452-466.

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