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Experimental investigation of Cd and Ga isotope fractionation during evaporation & condensation.

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Incomplete condensation as the reason for volatile element loss in solar system materials has been questioned. Under suitable circumstances, increased partial pressures may lead to equilibrium conditions for evaporation and thus, isotope fractionation may not be detectable [1-3]. Evaporation and condensation experiments are indispensable to understand how the observed pattern of volatile element depletion and isotope fractionation can be generated. In our first experiments we study the influence of various fO_2 atmospheres on Cd and Ga isotope fractionation and element distribution during evaporation of silicate melt at high temperatures. Furthermore we investigate the Cd isotope fractionation during re-condensation. We observed a moderate suppression of isotope fractionation during evaporation into air and stronger suppression into reduced atmosphere. Light isotopes are enriched in the condensates relative to the vapor.

[1] Davis, A.M. & Richter, F.M. (2003) Treatise on Geochemistry 1, 407–430. [2] Alexander, C.M.O. et al. (2000) Meteorit Planet Sci 35, 859–868. [3] Richter, F.M. et al. (2011) Meteorit Planet Sci 46, 1152–1178.

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