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# $fO_2$ and temperature guided alkali and Mn loss from synthetic silicate melts and gas mediated transfer - clues for early solar system evolution.

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The depletion of moderately volatile elements occurred within the first few million years of the solar system, as it is argued from whole rock Mn-Cr isochrones of carbonaceous chondrites [1]. The Mn-Na ratio of all groups of chondrites is nearly constant and set under specific $fO_2$ conditions. Any deviations from this ratio, as found in small planetary bodies like Vesta, Moon or Mars must be aquired in later, secondary events [2].

To shed light on the depletion process, heating experiments on alkali and Mn bearing melts were done in gas mixing and vacuum furnaces at 1450 °C and varying $fO_2$.

Under all experimental conditions Na exceeded Mn losses, explaining enhanced Mn/Na of small planetary bodies. The chondritic Mn/Na of the Earth's mantle may reflect the absence of Na losses during Earth's accretion or before during melting of Earth making embryos. Alternatively it may indicate partitioning of some Mn into the core, leading accidentally to a chondritic Na/Mn ratio in the Earth's mantle. [1] Shukolyukov, A. & Lugmair, G. W. (2006) EPSL 250, 200-213. [2] O'Neill, H. & Palme, H. (2008) Phil. Trans. R. Soc. 366, 4205-4238.

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