T and fO_2 guided, gas phase mediated Na and K exchange between silicate melt drops

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The overall depletion of volatile lithophile elements in the mantles of the terrestrial planets along with nearly unfractionated Mn/Na ratios [1] as well as the varying abundances of Na and K relative to Si in meteorites and even individual chondrules [2] leads to the question of the nature of the depletion process (evaporation or incomplete condensation). As our early experiments showed little or no loss from Na and K bearing minerals we focussed on evaporation from siliceous melts with different fractions of Al, Na, K and partly Fe, Ti and Mn.

We used 11 synthetic silicates with a molar Si/(Al+Na+K) ratio of 3/1, varying Al/alkali and Na/K ratios and NBO/T from 0 to 0.67. Each run contained samples of different composition. Also a Si, Fe, Ti and Mn bearing mixture enriched with Na and K was used. Samples' weights were about 4 mg. Time series were done in 1 atm CO/CO_2 gas mixing furnaces from 1000 to 1550 °C and log fO_2 from air to IW-2. Sample mounting was by Pt wire loop technique [3].

Under all experimental conditions Na and K are lost from high Na, K samples and gained by low Na, K samples, with all samples reaching an approximately constant level after several hours. The process is faster with increasing temperature and decreasing oxygen fugacity. The Na concentration at the converging point decreases with increasing gas flux, but is independent of Al concentration in the starting composition, despite variations from 0 to 26 wt % Al_2O_3. The effect for K is less pronounced.

Na and K contents are controlled by the Na and K vapor pressures in the furnace, which again is determined mainly by the gas flow in the furnace and by the total amount of alkalis released by heating. The lesser dependence of the K concentration from the gas flux is a hint to a faster kinetic behavior compared to the Na. More experiments with varying gas flow rates are in progress.

[1] Palme & O'Neill (2003) Treatise on Geochemistry (eds. Turekian, Holland), Vol 2, The Mantle and the Core (ed. Carlson). [2] Jones *et al*. (2005) in: Chondrites and the Protoplanetary Disk ASP Conference Series, **341:** 251-281. [3] Donaldson *et al*. (1975) *Am. Min*., **60**: 324-326.

Petrology of the Middle Eocene sub-volcanic association of Western Pontides

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The Middle Eocene (49.3±2 – 38.1±1.9 Ma) magmatic rocks (MEMR) form an east-west trending belt along the northern Turkey. They rest unconformably on the pre-Middle Eocene units. Here, we present geological and petrological data from the western part of this belt, between Armutlu Peninsula and the Almacık Mountains. These rocks forming a "sub-volcanic association" are represented by the basic to intermediate volcanic rocks, dikes and coeval granitic rocks. The volcanic rocks of the MEMR form a continuous trend from basalt to dacite. Granitic rocks comprise granite, granodiorite and tonalities. Both the volcanic and the granitic rocks display medium-K subalkaline affinity, and CA trend with rare tholeiitic lava samples. They display significant enrichment in LIL elements, and slightly enrichment in LREE. There are apparent impoverishments in Ta and N, in N-MORB normalized spider diagrams. Initial Sr and Nd isotopic values for the volcanic rocks of the MEMR are ($^{87}Sr/^{86}Sr_i$: 0.703976-0.706441) and ($^{143}Nd/^{144}Nd_i$: 0.512856-0.512601), respectively. From these data and combined ƐNd(T) (-1.55 - +5.38), Pb and ^{18}O (8.5-13) isotopic values, we conclude that the magma produced the MEMR was hybrid in composition, including depleted mantle and crustal components. AFC processes played an important role for the genesis of magma. According to these geochemical features, MEMR displays close similarity to the subduction-related magmas. In the light of geological and petrological findings, we conclude that the MEMR was produced in a post-collisional setting, and we favour the slab breakoff model that provides a better explanation for the generation of the MEMR.