

Cl, Br and I behaviour during magma differentiation and degassing: contribution of a new LA-ICP-MS analysis technique

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The use of ICP-MS QQQ technology (Agilent 8800) coupled with Laser Ablation (with Excimer 193 nm laser, Cetac) allows us to develop simultaneous, in-situ analysis of Cl, Br and I with very good precision and sensitivity, suitable for most geological material compositions.

This technique is specifically applied to the study of the behaviour of halogens in natural magmatic systems. We present here the first measurements obtained on volcanic materials (minerals, residual glasses and vitreous inclusions) and provide a set of consistent partition coefficients between solids, liquid and vapor for halogens. These results are discussed in terms of Cl/Br/I fractionation during magma differentiation and degassing and the possibility to use these ratios to characterise the mantle sources and their evolution.

This work more generally demonstrates the interest of this major analytical improvement for all studies of halogen behaviour in natural and experimental geological systems.