



Experimental forward approach to alkali-rich magma generation from the metasomatized mantle: Melting of mantle xenoliths from Tallante (Murcia, Spain)

Antonio Manjón-Cabeza Córdoba (1), Antonio Castro (1), Ignacio Moreno-Ventas (1), José López-Ruiz (2), and Jose María Cebriá (2)

(1) Unidad Asociada de Petrología Experimental CSIC-Universidad de Huelva. Campus El Carmen, 21071, Huelva (Spain),
(2) Instituto de Geociencias. CSIC, Madrid

Alkali-rich volcanism is a wide spread characteristic of the circum Mediterranean terrains. One of the outcrops of this kind of magmas is the “Cabezo Negro” Volcano in Tallante (Murcia, Spain). The “Cabezo Negro” lavas are alkali-rich basalts, with a Na/K ratio higher than 1, that were erupted between 3 and 2 My ago. Previous experiments have shown that the origin of alkali-rich series can be attributed to an Amphibole-rich metasomatized mantle. Continuing this work, we have carried out several forward experiments at the piston cylinder apparatus under different P-T conditions starting from a sample from a metasomatized mantle xenolith hosted in those lavas. The chosen xenoliths are amphibole bearing clinopyroxenites. Although there are some of them that are phlogopite-bearing, we have worked with those bearing only pargasite as a hydrous phase, in order to ease the understanding of the role of the amphibole in the melting process. The experiments were carried out at conditions ranging from 10 to 20 kbar and from 1000 to 1300 °C mostly of them were “dry”, but those under higher pressures were also under water saturated conditions. The results show compositions of melts that are very similar to those that can be found in the k-rich magmas around the Alpine Mediterranean orogenes. In particular, silica, the alkalis and the K/Na ratio tend to decrease with temperature and to increase with pressure for the experiments under dry conditions, to sum up, approaching to the amphibole stability-solidus line. For those under water saturated (and higher pressure) conditions, however, a slight increase of those values can occur with increasing temperature. Since in this kind of metasomatized mantle amphibole seems to draw the solidus line, we have analyzed the REE and other trace-element relations between amphiboles and the obtained melts seeking for the origin of particular REE affinities that can be found in post-orogenic magmas with adakitic or sanukitic signatures.