Crystal Structure of Non-Metamict Minerals of Chevkinite Group <u>Federica Liziero</u>^a, Elena Belluso^b, Susanna Carbonin^a, Luca Nodari^c, Umberto Russo^c, ^aDip. Mineralogia e Petrologia, Univ. Padova. ^bDip. Sc. Mineralogiche e Petrologiche, Univ. Torino. ^cDip. Scienze Chimiche, Univ. Padova. E-mail: federica.liziero@unipd.it

Crystal chemistry and structure of chevkinites occurring in a hightemperature pneumatolitic vein from Tangir Valley (Pakistan) and in some silica-saturated/oversaturated syenite clasts from São Miguel Island (Azores) were investigated.

Electron microprobe analyses suite the formula $A_4BC_4O_8(Si_2O_7)_2$, where A = REE, Ca, Th; B = Fe, Mn, Mg; C = Ti, Fe, Nb. Ce and La are the predominant elements in A sites: Ce2O3 range from 22% to 24% (wt.) and La₂O₃ from 10% to 14%. The major components in octahedral sites (B and C) are Fe and Ti: FeO range from 11% to 12% (wt.) and TiO₂ from 15% to 17%. The crystal structure was refined in the space group C2/m to conventional R(I/ σ (I)>4) of \cong 2%. Site occupancies were calculated on the basis of electron microprobe results, refinement electrons and bond valence analysis. An Fe^{3+}/\Sigma Fe ratio of 0.58 for Pakistan chevkinite was determined from Mössbauer spectroscopy. A preliminary spectral analysis points to the presence of two different types of Fe^{2+} , both in octahedral sites. TEM investigations revealed the high crystallinity of both chevkinites. At the SAED scale the Pakistan chevkinite shows absence of structural defects, whereas the Azores one shows strekked spots along [001] and [-111] directions. HRTEM study is in progress in order to explain the presence of defects in some directions and to evidence structural regularity in others.

Keywords: silicates of rare elements, crystal chemistry and structure, TEM