Confocal Raman spectroscopic characteristic of pseudoleucite in alkaline intrusive rocks: Central Anatolia, Turkey

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Pseudoleucite is one of the main mineral of the silica undersaturated rocks of alkaline rocks of Central Anatolian Crystalline Complex. The pseudoleucite comprises aggregates of K-feldspar and nepheline preserving orginal crystal forms of leucite. Confocal Raman spectroscopic studies reveal that the leucite has been replaced by disordered K-feldspar with a structural state intermediate between orthoclase and nepheline form in spheluritic texture under the microscope (Figure 1). The pseudoleucites are inferred to have grown of crystallization of leucite at high temperature and pressure then transformed to orthoclase with less amount of nepheline through reaction with sodium-rich fluids and PH_2O at low pressure and temperature in proportion to previous original formation of the leucite in the same system.

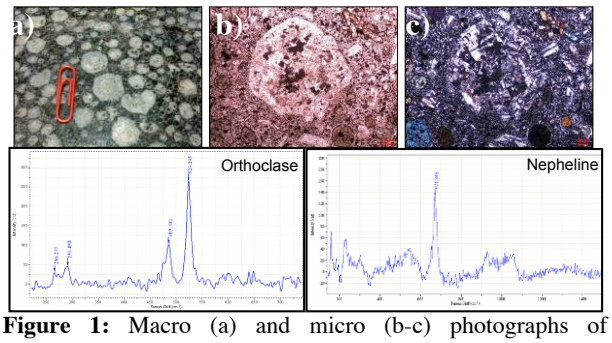

Figure 1: Macro (a) and micro (b-c) photographs of pseudoleucite and CR Spectrums of orthoclase and nepheline

Discussion and Results

Compositional zoning in primary and late-stage minerals indicates complex, multi-stage crystallization and replacement histories. Late stage fluids of alkaline magma, rich in F, Cl, CO_2 and H_2O, reacted with primary minerals to form complex intergrowths of minerals such as pseudoleucite, cancrinite, fluorite, V-bearing magnetite, F-bearing garnet and Na-augite. Early crystallization of apatite and titanite controlled the compatible behavior of P and Ti, respectively.

The formation of melanite and uvarovite garnet also affected the behavior of Ti, Cr as well as Zr, Hf and the heavy rare-earth elements in these rocks. The innovator crystalization of leucite, cause to intergrowths of K-feldspar and nepheline at the late stage of fractionation.

Global asssesments of linkages between air quality and climate

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Aerosols are among the most important contributors to air quality problems, and are also active constituents of the climate system. Unfortunately, there are large scale differences between global climate models and urban-to-regional scale air quality models, which prevented consistent and extensive scientific analysis of air quality and climate impacts. In addition, since air pollution and greenhouse gas mitigation policies were often developed independently, a policy driver to the integrate these urban-to-global scales was missing. This situation is changing- global models are increasing resolution, and regional models are expanding model domains. Global model analysis are used for air quality analysis, and regional models are use for regional climate assessments. The co-benefits for air quality are increasingly important aspects of climate policies, while targetted air quality policies may help to prevent rapid climate change on the decadal time scales.

In this overview talk, I will present results from the international HTAP (Hemispheric Transport of Air Pollution) assessment, with a focus on the role of contintal transport versus 'local' emissions of aerosols and precursors, discuss re-analysis efforts to understand the interaction between changing climate and air quality in the past decades, and the describe the current understanding of the health and climate effects of these aerosols on the global scale. I further present the implications and insights derived from various air pollution/climate scenarios resulting from recent assessments (GEA, RCP, etc).