Mineralogy and geochemistry of the Yellice magnetite occurrences of Sivas-Central Anatolia, Turkey

C. OZTURK*, T. UNLU AND İ.S. SAYILI

Ankara University, Department of Geological Engineering, 06100, Tandoğan, Ankara
(*correspondence: cozturk@eng.ankara.edu.tr)

Ophiolitic rocks, trusted tectonically over Munzur limestones of Taurus platform and emplaced during Maastrichtian form the basement of the study area.

The primary ore mineral at Yellice is magnetite in serpentinized ultramaphic rocks of ophiolites. Other ore minerals are chromite, machinavite inclusions bearing pentlandite, pyrrhotite, cubanite lamellae bearing chalcopyrite and pyrite characterizing a liquid magmatic phase. Secondary magnetites of a subsequent phase are formed from ferromagnesian minerals during serpentinization processes.

XRD studies carried on post-tectonic basin deposits (e.g. basalts) indicate albite, calcite, augite, chlorite, olivine and lizardite minerals which point out to minerals occurred by ocean floor metamorphism [1]. Two different mineral assemblages occur in serpentinites. The first paragenesis is antigorite, talc, magnetite, magnezite and chlorite which indicate nearly 400-500 °C temperature conditions [2]. The second paragenesis represented by chrysotile, lizardite, diopside, augite, tremolite, actinolite, calcite, quartz, chromite, magnetite, olivine and talc characterize approximately 350-400°C temperatures and suggests an ocean floor (or hydrothermal) metamorphism [3].

Raman studies revealed that the plagioclases of basaltic rocks are albitized by the affects of sea water. Some pyroxenes are replaced by actinolites due to uralitization.

Consequently, lens shaped magnetite ores with an average grade of 18-20 % Fe_3O_4 and 125 millions tons of tonnages in serpentinites suggest an assemblage of primary minerals formed in upper mantle conditions and a further element association by serpentinization processes.

[1] Stern *et al*. (1979) *Tectonophysics* **55**, 179–213. [2] Iyer *et al*. (2008) *Chem. Geol*. **249**, 66–90. [3] Coleman (1977) *Ophiolites*, **229**.