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Role of Granitic Intrusions and Serpentinization Processes in The Forming of Iron Deposits: Yellice-Dumluca Iron Deposits, Divrigi, Sivas, Turkey

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Divrigi iron ore deposit is one of the most important iron province in Turkey. Genesis of the Divrigi iron deposits is still highly controversial. In Divrigi-Yellice vicinity, no granitic intrusions takes place. Low grade (average 18-20% Fe3O4), 125 million tones magnetite formation in Yellice deposit is found within serpentinites. On the other hand, in Divrigi-Dumluca deposit, granitic intrusions cut the serpentinite units. In the contact between granitic and serpentinized rocks, high grade (%57 Fe), 8 million tones magnetite is substantive.

Yellice deposit is consist of characteristic liquid magmatic phase minerals such as chromite, magnetite, pentlandite, pyrotine, chalcopyrite and also pyrite disseminations. Due to serpentinization process, secondary magnetites formed by the iron released from ferromagnesian minerals. Also pyrite and silicate minerals accompanies secondary magnetite occurences. In Dumluca deposit, ore minerals such as magnetite, hematite, pyrite, chalcopyrite, limonite, marcasite, millerite accompanied by characteristic skarn zone paragenesis, diopside, actinolite and quartz.

Performed Confocal Raman Spectroscopy studies to determine the serpentine types show that, serpentine minerals of Yellice deposit is mainly antigorite with talc. But however, serpentine minerals of Dumluca deposit is mostly chrysotile. This difference suggests that, serpentinization in Yellice deposit occurred in high temperatures (450-550˚C), otherwise in Dumluca deposit, serpentinization occurred in relatively low temperatures (350-400˚C).

Performed chemical analysis on ore samples shows the distinct differences in major oxides such as $Fe2O_3$, MgO, SiO_2, $Al2O_3$, Na2O, $Cr2O_3$ and in trace elements, Rb, Sr, Zr and Ni. Yellice samples have mean 48,79% $Fe2O_3$, 28,24% MgO, 26,46% SiO_2, 1,05% $Al2O_3$, 0,02% Na2O, 0.712% $Cr2O_3$ and 44,7 ppm Rb, 6,2 ppm Sr, 1,9 ppm Zr, 2592,9 ppm Ni values whereas Dumluca samples have mean 65,29% $Fe2O_3$, 10,24% MgO, 37,66% SiO_2, 4,38% $Al2O_3$, 0,72% Na2O, 0.024% $Cr2O_3$ and 82,8 ppm Rb, 48,6 ppm Sr, 38,1 ppm Zr, 203,7 ppm Ni. Differences in chemical compositions, especially enrichments in major oxides of granitic composition (SiO_2, Na2O, $Al2O_3$) and mobile elements (Rb, Sr, Zr) related with granitic intrusions seen in Dumluca deposit may show the effects of intrusion in ore forming. But however, in Yellice deposit, enrichments especially in MgO, $Cr2O_3$ and Ni shows the effect of serpentinization process in ore forming compared to Dumluca deposit.