Geochemistry of laterite-type nickel deposit at the Rio Tuba mine, Palawan Island, Philippines

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The nickel deposit at the Rio Tuba mine is hosted in laterite; nickel was concentrated during lateritization of the serpentine. The weathered profile of the nickel deposit is composed of upper laterite and lower saprolite zones. The laterite zone is chemically dominated by Fe_2O_3(˜60 wt.%) and Al_2O_3(˜10 wt.%), whereas iron content decreases downward and saprolite zone is characterized by enrichment of SiO_2(˜35 wt.%) and MgO(˜25 wt. %).Maxmum concentration of Ni, 2.3 wt%, appears in saprolite zone. Mineralogical investigation using XRD suggests that weathered profile can be divided into three zones of upper goethite-hematite, middle talc-smectite, and bottom lizardite zones. Correlation plots between Ni content and those of elements with similar ionic radii of Ni suggests that Ni substitutes Al or Fe in talc-smectite zone. The nickel deposit of the Rio Tuba mine corresponds to clay silicate type deposit, because highest grade of Ni appears in talc-smectite zone and these minerals probably host Ni.