Mantle-crust interation formed unique ores in the SCLM of the Serranía de Ronda peridotites (South Spain).

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The Serranía de Ronda ultramafic massifs correspond to portions of SCLM affected by infiltration of astenosphere-derived melts coeval with exhumation. This resulted in the formation of three petrostructural zones named as the spinel tectonite domain (STD), a granular peridotite domain (GPD) and a plagioclase tectonite domain (PTD). The STD represents the SCLM protolith, the GPD developed at expenses of the former by partial melting and melt accumulation at the boundary between both domains (namely the recrystallization front) and the PTD resulted from the ductile deformation of the GPD during the crustal emplacement of the peridotites.

These massifs host a rather unique set of magmatic ores including chromite and Ni arsenides associated with orthopyroxene and/or cordierite (Cr-Ni ores), Fe-Ni-Cu sulfides with graphite (S-G ores), and chromitities (Cr ores). These ores distribute spatially according to the petrological zoning of the massifs: the Ni arsenide- and cordierite-rich Cr-Ni ores, as well as most S-G ores, normally locate within the peripheral STD and the Cr ores occur in the PTD.

These different types of ores formed by variable degrees of mixing between mantle derived, small-volume melts and silica-rich fluids derived from dehydration of crustal metasediments. The former migrated and fractionated upward from the recrystallization front and mixed occasionally with the infiltrating fluids during the crustal emplacement of peridotites, forming the Ni arsenides- and cordierite-rich Cr-Ni ores. As the peridotite body cooled from the periphery inwards, progressively smaller volumes of crustal-derived fluids reached its interior and mixed with less fractionated, mantle-derived melts forming Ni arsenide-poor Cr-Ni ores and subsequently the Cr ores. The genesis of S-G ores linked with that of Cr-Ni ores as attested by their frequent close spatial connection, the existence of mineralizations sharing characteristics of both ore types and the strong partitioning of platinum-group elements in Ni arsenides instead of sulfides.