2004 Fall Meeting
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Cite abstracts as **Author(s) (2004), Title, *Eos Trans. AGU, 85*(47), Fall Meet. Suppl., Abstract xxxxx-xx**

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pali aike

HR: 1340h

AN: **V43A-1419**

TI: Platinum-group elements and oxidation condition of Paleozoic sub-continental lithospheric mantle in southernmost South America: Xenolith study in the Pali-Aike Region, Chile

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AB: Mantle xenoliths are abundant in Quarternary alkaline basalts in the Pali-Aike area of southernmost South America. The area is in the Andean back-arc region and most samples were derived from the depth of $>$60 km. There are two types of mantle xenoliths: cumulates of partial melt and mantle residues. The former are pyroxenites (orthopyroxenite, websterite) and contains significant contents of globular sulfides ($>$0.1 %), Mg-ilmenite ($>$ 1 %), and Phl ($>$ 2 %). The bulk rocks are low in PGE, 2.20-15.5 ppb, and show positive-sloped mantle-normalized patterns, similar to host basalts. This confirms the incompatible nature of Pt group PGE. Ol websterite, which shows low P and T, $\sim$ 15 kb and $780\deg$C, has the highest Mg\# (0.74) and lowest Cr\#sp ($\sim$0.186) and has fO2 similar to FMQ buffer, representing a relatively shallow cumulate of partial melt. The mantle residues are Grt lherzolite, Grt-Spl lherzolite and Grt-Spl harzburgite. Grt lherzolite and Grt-Spl lherzolite have high CaO (2.43-3.33wt %) and Al2O3(3.14- 4.18 wt %), whereas Grt-Spl harzburgites are low in CaO (0.99-1.21wt %). Sulfides are rare, and occur as inclusions in Ol and Opx, and as films along boundaries of silicate and oxide minerals. Some harzburgites are modally metasomatized by partial melt, forming Phl and Prg amphibole. The melt itself was solidified into ilmenite- and sulfide-rich pyroxenite veinlets. The calculation of fO2 using the Sp-Ol-Opx equilibria shows that the fertile garnet-bearing peridotites are reduced, ΔfO2 ranging from FMQ-0.50 to -0.20 with the Cr\#sp from 0.29 to 0.30, similar to those in oceanic peridotites. Depleted harzburgites have slightly elevated, but comparable fO2 (FMQ-0.36 -FMQ+0.39) and Cr\#sp (0.28-0.33). The mantle residues contain total PGE ranging from 6.92 to 22.1 ppb, slightly lower than the primitive mantle value, but show flat normalized patterns. Metasomatized harzburgites contain comparable Cu and total PGE contents as anhydrous peridotites. The data suggest that the metasomatism by partial melt originated from the underlying asthenosphere was not accompanied by significant change in PGE and redox state.

DE: 3655 Major element composition

DE: 3670 Minor and trace element composition

DE: 1025 Composition of the mantle
DE: 1065 Trace elements (3670)
SC: Volcanology, Geochemistry, Petrology [V]
MN: 2004 AGU Fall Meeting

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