

MEYMECHITES -- A NEW CLAN OF DIAMOND-BEARING ULTRAMAFIC VOLCANIC ROCKS

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Meymechites are ultramafic volcanics associated with Phanerozoic arc terranes. Meymechites contain Fo-rich olivine along with chromite, Cr-diopside and orthopyroxene, high-Cr pyrope garnet, Mg-ilmenite, zircon, rutile, and corundum. Meymechites have high MgO, Cr, Ni, and low Ti, Zr, and Nb concentrations coupled with relatively high LREE and Sr contents which suggest derivation from subduction-modified mantle. Pb-isotopes indicate the involvement of a subducted sediment in the source. Diamonds are associated with meymechites in Russia, typically colorless to green, yellow and grey, and have octahedral, dodecahedral, and rarely, cubic shapes. The Central West district in NSW (eastern Australia) hosts the largest diamonds found in NSW, and these are found in alluvial deposits which are closely associated with Ordovician arc meymechites. These particular NSW diamonds appear similar to those from Russia. The arc geochemistry of meymechites and the eclogitic nature of associated diamonds (light to heavy C-isotope values, eclogitic minerals, and saline fluid inclusions) suggest that they are related to subduction. We believe that arc-related meymechites are likely sources for headless diamond placers in Phanerozoic mobile belts and that they can be successfully used for diamond exploration in accreted terranes.