DISTINCTIVE MAGNESIAN, PROTOGRANULAR AND POLYMICT DIOGENITES FROM NORTHWEST AFRICA, OMAN AND UNITED ARAB EMIRATES

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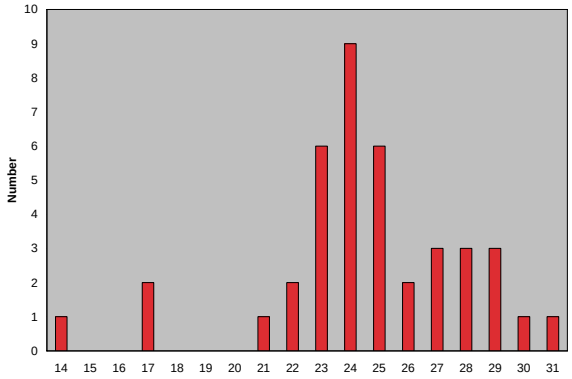
Our studies of diogenites collected recently from hot deserts (24 from Northwest Africa, 2 from Oman and 3 from UAE) have revealed new compositional and textural types not previously represented in collections, which have important implications for magmatic and impact mixing processes on 4Vesta. The majority of the specimens resemble classic falls and finds in that they are crushed or cataclastic monomict orthopyroxenites composed predominantly of orthopyroxene ($Fs_{22-31}Wo_{1.3-3.6}$, FeO/MnO = 25-35) with accessory chromite, troilite and Ni-poor metal. Several examples contain minor olivine (Fa_{25-39}), calcic plagioclase (An_{78-96}) and/or clinopyroxene; **NWA 3329** contains minor silica and merrillite. **NWA 1461** (composed mostly of $Fs_{13.6}Wo_{0.8}$ orthopyroxene) is the most magnesian diogenite known, and attests to the existence of some very primitive Vestan parent magmas (as also inferred from dunite NWA 2968 [1]). **NWA 1821** and **UAE 005** have distinctive protogranular textures, similar to that of GRO 95555 [2]. "Necklace" textures of various phases within chromite (as reported [3] in **NWA 4215**) occur in **NWA 2997, UAE 004** and unique ***vesicular*** diogenite **Dhofar 700**. **NWA 4473** is a polymict breccia with clasts from at least three different diogenite precursors (mean opx compositions: $Fs_{17.2}Wo_{1.0}$, $Fs_{21.6}Wo_{2.1}$ and $Fs_{37.2}Wo_{3.5}$, FeO/MnO = 29.3-34.4).



Fs values in orthopyroxene for 40 diogenites [this work, 2-4]

Oxygen Isotopes: Results of laser fluorination analyses on acid-washed samples: **NWA 1461** $\delta^{17}O$ = 1.410, 1.634; $\delta^{18}O$ = 3.177, 3.584; $\Delta^{17}O$ = - 0.261, - 0.251 per mil; **NWA 1821** $\delta^{17}O$ = 1.43; $\delta^{18}O$ = 3.23; $\Delta^{17}O$ = - 0.269 per mil.

References: [1] Bunch T. et al. 2006. *69th Met. Soc. Mtg.*, #5252 [2] Papike J. et al. 2000. *LPS XXXI*, #1009 [3] Barrat, J.-A. et al. 2006. *MAPS* 41: 1045-1057 [4] Fowler G. 1994. *GCA* 58: 3921-3929; *Meteorit. Bulls.* 87-91.