

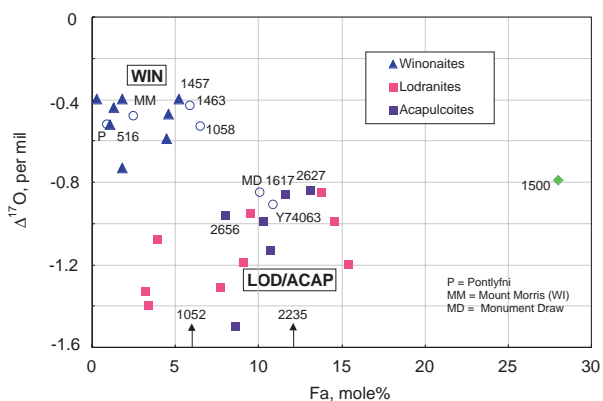
DISCRIMINATION OF ACAPULCOITES AND LODRANITES FROM WINONAITES.

D. Rumble, III¹, A. J. Irving², T. E. Bunch³, J. H. Wittke³ and S. M. Kuehner²,
¹Geophysical Laboratory, Washington, DC 20015
rubble@gl.ciw.edu; ²Earth & Space Sciences, Univ. of Washington, Seattle, WA 98195; ³Dept. of Geology, Northern Arizona University, Flagstaff, AZ 86011.

Introduction: Combined petrological and oxygen isotopic analyses of five Northwest African primitive achondrites (NWA 516, NWA 1457, NWA 1617, NWA 2627 and NWA 2656) have clarified the relationships among acapulcoites, lodranites and winonaites. It would not be possible to properly classify some specimens in these groups using their mineral compositions alone (see plot below).

Petrology: These new specimens have polygonal-granular textures (grainsize 0.4-0.8 mm) and lack chondrules. Mineral compositions are, respectively: orthopyroxene Fs 1.25, 6.2, 11.2, 12.3, 8.4; olivine Fa 1.03, 5.2, 11.6, 13.1, 8.0; plagioclase An 9.5, 14, 16, 20.9, 22, with metal, troilite and schreibersite. NWA 516, 1457 and 2656 contain Cr-diopside ($\text{Fs}_{0.76}\text{Wo}_{45}$, $\text{Fs}_{2.8}\text{Wo}_{44}$, $\text{Fs}_{3.8}\text{Wo}_{44}$, respectively); NWA 1457, 1617 and 2656 contain chromite ($\text{Cr}/(\text{Cr}+\text{Al}) = 0.87, 0.89, 0.85$, respectively); NWA 1457 contains minor Cl-apatite and thin daubreelite blades in troilite.

NWA 1463 is a Type 5 metal-rich chondrite with a recrystallized matrix proposed by [1] to be related to the winonaite parent body. A sample provided to us by D. Gregory contains $\text{Fa}_{5.9}$ olivine (more ferroan than reported by [1]), and has, respectively, $\delta^{18}\text{O} = 2.92, 3.18, 3.44$; $\delta^{17}\text{O} = 1.10, 1.24, 1.40$; $\Delta^{17}\text{O} = -0.45, -0.44, -0.42$ per mil.



Olivine and oxygen isotopic compositions for primitive achondrites and related chondrites (circles). Numbers refer to NWA specimens. Data from this work and [2].

References: [1] Benedix G. et al. 2003 *66th Met. Soc. Mtg.*, #5125 [2] Benedix G. et al. 1998 *GCA*, 62, 2535-2553; Clayton R. and Mayeda T. 1996 *GCA*, 60, 1999-2018; yamato.nipr.ac.jp/AMRC/AMRC/meteoritelist.pdf; Bartoschewitz R. et al. 2003 *66th Met. Soc. Mtg.*, #5114; Mittlefehldt D. and Hudon P. 2004 *67th Met. Soc. Mtg.*, #5086; Russell S. et al. 2004 *Met. Bull.* 88; Moggi-Cecchi V. et al. 2005 *LPS XXXVI*, #1808.