IS NWA 1463 THE MOST PRIMITIVE WINONAITE? G.K. Benedix[1], T.J. McCoy[2], and D.S. Lauretta[3], [1]Washington University, Dept. of Earth and Planetary Sciences, Saint Louis, MO 63130 USA (gbenedix@levee.wustl.edu); [2]Dept. of Mineral Sciences, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0119 USA; [3]Planetary Sciences Dept., Lunar and Planetary Laboratory, Univ. of Arizona, Tucson, AZ 85721-0092 USA.

Introduction: Winonaites are stony meteorites with chondritic mineralogy and chemistry, but non-chondritic textures. Extensive metamorphism, partial melting and brecciation in the winonaite-IAB parent body have erased the chondritic texture of the precursor [1]. Winonaites occupy a compositional gap intermediate between enstatite and ordinary chondrites and it is unclear whether the precursor chondrite also occupied this gap or whether, e.g., reduction of an ordinary chondrite protolith, produced the winonaites [2]. In this abstract, we report on the new meteorite NWA 1463, which appears to be the most primitive winonaite and may help solve this puzzle.

Results: The meteorite contains orthopyroxene ($Fs_{7.4}Wo_{1.2}$), olivine ($Fa_{3.2}$), plagioclase ($An_{12.6}$), clinopyroxene ($Fs_{3.4}Wo_{45}$), phosphate (whitlockite), chromite ($Chr_{47.3}Pchr_{46.1}$), phosphide, troilite, and abundant Fe,Ni metal. Mineral compositions are consistent with classification of NWA 1463 as a winonaite [1]. NWA 1463 extends the trend in oxygen fugacity and temperature derived from the olivine-chromite thermometer for other winonaites-IAB silicates (FIG. 1), plotting at log fO_2 ~ IW – 3 and a temperature of ~870°C. The oxygen isotopic composition, which would confirm this classification, will be reported at the meeting. Texturally, NWA 1463 resembles a petrologic type 5 chondrite, with abundant relict chondrules set in a recrystallized ground mass. This contrasts with other winonaites, which exhibit granulitic textures, equant mineral grains, and triple junctions indicative of extensive metamorphism. In addition, NWA 1463 lacks evidence for parent body melting (e.g., Fe,Ni-FeS veinlets) common in other winonaites and Fe,Ni metal is more abundant than in other winonaites.

Discussion: The low olivine-chromite equilibration temperature, abundant relict chondrules, and overall chondritic texture imply that NWA 1463 is the most primitive winonaite. This suggests either chondritic rocks similar in mineralogy and mineral composition to winonaites did exist or that, e.g., reduction of a more oxidized chondritic protolith happened at lower temperatures than previously envisioned. The question of whether NWA 1463 could represent the protolith for all winonaites and IAB irons remains unresolved.

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References: [1] Benedix G.K. et al. (1998) *GCA., 62,* 2535-2553. [2] Ford R. et al. (2003) *LPS XXXIV,* Abstr. #1713.

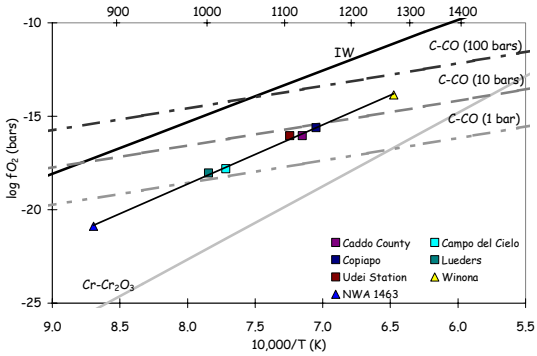

Figure 1. Log fO2 vs 1/T for the IAB-winonaite group.