A DISSOLVED OLIVINE XENOCRYST COMPONENT IN THE ANGRITE MAGMA. T. Mikouchi[1] and G. McKay[2], [1]Department of Earth and Planetary Science, University of Tokyo, Tokyo, Japan, [2]Mail Code SR, NASA Johnson Space Center, Houston, TX 77058, USA (E-mail: mikouchi@eps.s.u-tokyo.ac.jp).

The angrites are a small group of achondrites characterized by unusual mineralogy and old ages [e.g., 1]. Recent discovery of additional angrite samples offers substantial information to understand this enigmatic achondrite group. These new angrites (Sahara99555, D'Orbigny and NWA1670) show porphyritic to ophitic textures similar to LEW87051 and Asuka881371, suggestive of rapid cooling histories ("quenched" angrites) and are distinct from the other slowly cooled angrites (Angra dos Reis and LEW86010) [e.g., 2-3]. The quenched angrites often contain large olivine grains out of Fe/Mg equilibrium with the groundmass melt. Our previous studies [e.g., 2] pointed out that these olivine grains are essentially Cr-rich and Ca-poor and are possibly xenocrysts. The unique olivine composition in these samples also suggests that they share a common origin. Thus, the similar mineralogy of the groundmass minerals as well as the presence of Cr-rich and Ca-poor olivine xenocrysts indicates that these quenched angrites are closely related and they are co-magmatic. We found strong correlations among major elements in these quenched angrites, further supporting this hypothesis. The range of bulk compositions is 9.2-12.5 wt% Al_2O_3, 10.8-15.1 wt% CaO, 6.5-19.4 wt% MgO, and 19-24.7 wt% FeO [e.g., 4]. These compositional variations are well understood by olivine control (Fig. 1). Because olivine xenocrysts are absent or very rare in Sahara99555 and D'Orbigny, we suggest that their bulk compositions represent an angrite magma composition that is not contaminated by the xenocryst component. In contrast, LEW87051 and Asuka881371 contain ~10% olivine xenocrysts and appear that their bulk compositions include large amounts of dissolved olivine xenocryst components. The newly recovered angrite NWA1670 is also abundant in olivine xenocrysts [5]. Thus, we expect that its bulk composition would be similar to or more mafic than those of LEW87051 and Asuka881371.

References: [1] Mittlefehldt D. W. et al. (1998) *Reviews in Mineralogy*, *36*, 4-131. [2] Mikouchi T. et al. (1996) *Proc. NIPR Symp. on Antarct. Meteorites*, *9*, 174-188. [3] McKay G. et al. (1998) *Meteorit. Planet. Sci.*, *33*, 977-983. [4] Mittlefehldt D. W. et al. (2002) *Meteorit. Planet. Sci.*, *37*, 345-369. [5] Mikouchi T. et al. (2003) *Meteorit. Planet. Sci.*, *38*, Suppl. (this volume).

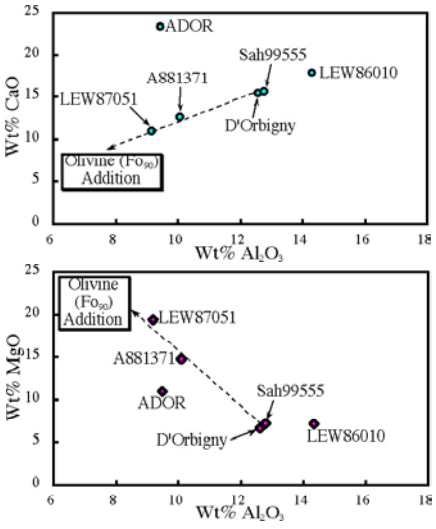

Fig. 1. Variations of bulk compositions (Al, Ca and Mg) among angrite meteorites. These figures show that olivine (Fo_{90}) addition is an important factor to control the bulk compositions of quenched angrites. Angra dos Reis (ADOR) and LEW86010 seem to be unrelated to these trends.