S ASTEROIDS: ARE SOME OF THE MISSING MELTS UOC? D. W. G. Sears[1,2] *(dsears@uark.edu)*, K. M. Gietzen[1], D. R. Ostrowski[1], C. H. S. Lacy[1,3] and. [1]Arkansas Center for Space & Planetary Sciences. [2]Dept of Chemistry and Biochemistry. [3]Dept of Physics, Univ. of Arkansas.

Introduction: At a previous MetSoc meeting Gaffey posed the question "Where are the partial melts?"[1] We would like to respond that many or most S asteroids are actually related to the unequilibrated ordinary chondrites (UOC) and are not melts.

Background: The reflectively spectra of asteroids in the near IR consists of Band I at ~1 µm due to olivine (OL) and pyroxene (PX), and Band II at ~2 µm due only to PX. Clinopyroxenes (CPX) have bands displaced ~0.5 µm to longer wavelengths relative to those of orthopyroxene (OPX) [2]. In Fig. 1, the many S asteroids plot on an OL-OPX mixing line with CPX-bearing basaltic achondrites (BA) displaced to longer Band I centroid wavelengths [3].

Proposal: Gaffey and his colleagues assume that CPX detected on the asteroids is calcic and of igneous origin [4]. The PX in UOC is Ca-poor CPX. Reflectivity spectra of UOC resemble those of many S asteroids and, as expected, analysis using the MGM software [2] detects considerable CPX. We suggest that the OL-CPX mixing line expected for UOC runs parallel to the OL-OPX mixing line with the PX end displaced 0.05 µm (Fig. 1). Thus many or most of the S(II), S(III) and S(V) asteroids may have surfaces resembling UOC, rather than being melts or partial melts.

Implications: Onion-skin models for meteorite parent bodies predict a surface of UOC material with volumetrically large interiors of EOC material [4]. Disruption and reassembly to form rubble-piles would bring EOC material to the surface. The distributions of K-Ar ages [5] and cosmic ray exposure ages [6] suggest that the EOC were from the interior of a few large bodies. Thus it should come as no surprise that EOC material and UOC material should both exist on the surfaces of S asteroids, but while the majority of meteorites falling on Earth are EOC, UOC should be far more abundant in the asteroid belt.

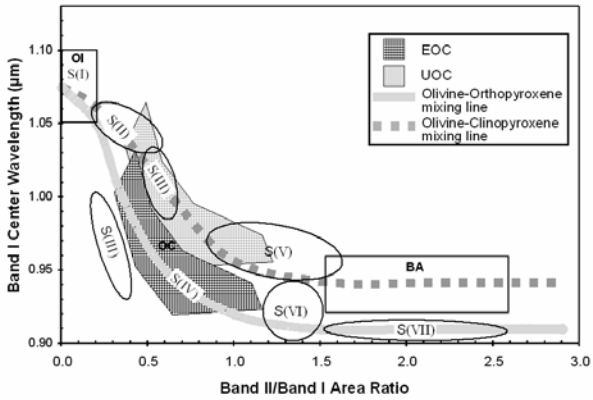

Fig. 1. Band I centroid *vs*. band-area ratio for S asteroids with the classes and OPX-OL and CPX-OL mixing lines indicated.

References: [1] Gaffey (2007) *MAP Suppl.* **42**, A5296. [2] Sunshine & Pieters (1993) *JGR* **98**, 9075. [3] Gaffey *et al*. (1993) *Icarus* **106**, 573. [4] Akridge *et al*. (1998) *Icarus* **132**, 185. [5] Bogard (1995) *Meteoritics* **30**, 244. [6] Marti & Graf (1995) *Ann Rev Earth and Planet Sci.* **20**, 221