INHOMOGENEOUS DISTRIBUTION OF MATERIALS IN LODRANITES-ACAPULCOITES AND IAB IRONS AND THEIR COMMON FORMATION PROCESSES; Hiroshi Takeda, Mayumi Otsuki, A. Yamaguchi, M. Miyamoto, Mineralogical. Inst., Faculty of Science, Univ. of Tokyo, Hongo, Tokyo 113, Masayuki Otsuki, JEOL Ltd. 3-1-2 Musashino, Akishima, Tokyo 196 and M. Tomobuchi, Kawasho Hightex Co., Ltd. 2-1-13 Higashiueno, Taito-ku, Tokyo 110, Japan and Takahiro Hiroi, SN3, NASA Johnson Space Center, Houston, Texas 77058.

Two dimensional chemical mapping analysis (CMA) techniques of EPMA and XRF have been applied to a new polished thin section (PTS) of EET84302,28, Acapulco and a 5x3 cm slice of Caddo County to find heterogeneous regional distribution of low temperature fractions in the lodranite-acapulcoite groups and silicate inclusions in the IAB irons. A region richer in metal-plagioclase were found in EET84302,28 and Caddo County. Mineralogy of EET84302,28 is not much different from coarse-grained metal-rich acapulcoite-like mineral assembrage in EET84302,19, which has chromite -orthopyroxene segregation. Nearly uniform Mg/Fe ratios of silicates modified by reduction at regional oxygen fugacity and large difference in modal abundances of minerals in this meteorite group can be explained by regional concentration of materials when the souce materials were partly melted.

Segregation of chromites and metal-silicates has been found in lodranite EET84302,19 [1] and of mafic silicates and plagioclase-augite-metal in IAB iron, Caddo Co. [2]. In order to find distribution of materials in a larger area than that of PTSs, a large sample of Caddo Co. and a new PTS of EET84302 (,28) and Acapulco have been studied by mineralogical techniques including CMA techniques of electron probe microanalysis (EPMA) and microbeam X-ray fluorescent (XRF) analysis.

PTS of EET84302,28 has been supplied from Meteorite Working Group (MWG). This PTS is similar to a part of the previously studied PTS of EET84302 in both texture and mineralogy [3]. Samples of Acapulco and Caddo Co. is from the Planetary Materials Database Collection of Univ. of Tokyo. We have studied PTS EET84302,28 by JEOL Electron Probe Microanalyzer JXA 8900 and scanning electron microscope (SEM) 840A. The CMAs of EET84302,19 and ,28 were performed by JEOL EPMA for 600X1024 points with 8 μm intervals for Si, Mg, Al, Fe, Ca, Ti, Na, Mn, Cr, Ni, S, and P at 15 kV 10.6 nA. Elemental distribution maps of Caddo Co. (5x3 cm) was measured by Kevex Omicron XRF Unit equipped with EDS and microfocus X-ray tube. Concentration of Fe, Ca, Ni, Co, Cr, Mn, and S were measured by XRF with 100 μm collimator, Mo radiation at 40 kV, 0.8 mA in air and those of Mg, Ca, Al, Si with 2 mm collimator at 4.5 kV, 1.0 mA in vacuum and scanned 3 times on an uncoated cut surface.

The CMA of EET84302,28 (e.g. Fig. 1) showed that it consists of abundant metal filling interstices of silicate grains of orthopyroxene (Opx), olivine Fa_8, plagioclase(Plag.) An_{24}, and augite (Aug), but no chromite has been detected. Modal abundances of minerals are: Opx 38.4 %, olivine 18.5 %, Plag. 12.6 %, Aug 0.8 %, FeNi metal 26.8 %, (FeNi oxides 2.1 %), schreibersite 0.7 %, and troilite 0.1 %. EET84302,19 is richer in chromite (17 %) and its grains are interconnected to form a domain of chromitite with rounded inclusions of silicates (Opx 50.7 %). Another area is similar to EET84302,28. Modal abundances of minerals in the metal-rich region of EET84302,19 (Opx 31 vol.%, olivine 21 %, plagioclase 16 %, Aug 1.3 %, metal 22 % and Fe oxides 9 % etc. for 2 mm area in diameter) are similar to PTS

,28, which is enriched in metal and plagioclase (Fig. 1) and depleted in chromite. A large poikilitic olivine (2 mm) with small plagiocalse inclusions are present. An amoeboidal grain of metal-troilite-chromite assemblage as was found in EET84302,19 [1] was detected in Acapulco.

The CMA of 5x3 cm slice of Caddo Co. confirmed the presence of the plagioclase(Al)-rich or augite(Ca)-rich regions [2] in cm scale (Fig. 2). Mafic silicate-rich area as studied by Plame et al. [4] are also found. However, we have to admit that silicate inclusions in the IAB group have different oxygen isotopic abundances from those of lodranites-acapulcoites [5]. Lodranite-like meteorites in mineralogy and bulk chemistry are missing in the winonaite-IAB group and those of Caddo Co. have not been found in the acapulcoites-lodranites group. Although two groups may represent meteorites from two different S asteroids, there may be common processes to form such meteorites from similar source materials. Our fingings suggest that large variation in modal abundance of minerlas with their small compositional ranges in these groups of meteorites may stem from segregation of partial melts and the residues in different regions within two parent bodies in a scale of cm to more than m. The heterogeneous distribution of materials is in line with our proposed model of S asteroids [6].

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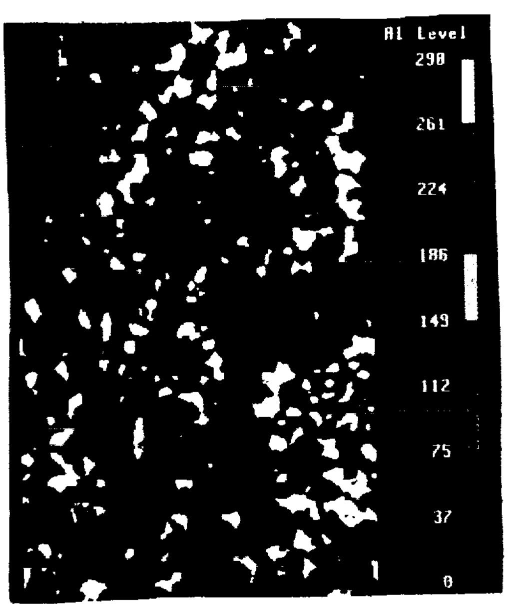

Fig. 1. Example of B&W image of the colored CMA map EET84302,28 for Al. Hight is 8.1 mm. Note appreciable amounts of plagioclase.

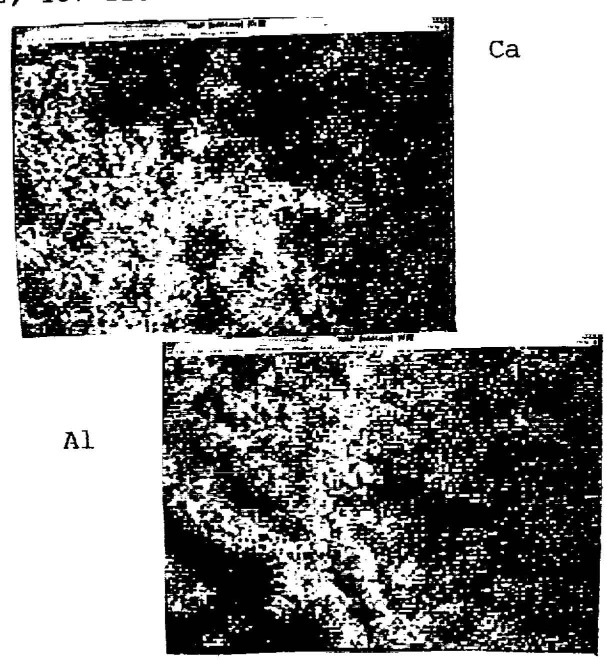

Fig. 2. Examples of B&W images of the CMA maps of Ca and Al by microfocus XRF. Width is 4 cm.