Metal formation in Ordinary Chondrite

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Ordinary chondrites (OC) are undifferentiated meteorites, mainly composed of silicates, metal and sulfide, which underwent metamorphism due to ^{26}Al heating. It is commonly proposed that differentiated bodies have been formed by differentiation (i.e. metal silicate segregation) of early formed undifferentiated bodies. Recent high precision W-Hf measurement of iron meteorites formation suggested that their parent's bodies were differentiated during, or closely after, CAIs formation (i.e. between 0 to 2 Ma after CAIs) [1]. Therefore, OC parents bodies should not be the precursor of iron meteorites as their accretion time have been estimated to occur around 2.2 Ma [2]. Moreover, it has been demonstrated that metal of OC has not been formed by condensation from the protoplanetary gas [3]. Yet, mechanisms that lead to metal formation in OC remains a subject of debate. New XRF mapping shows the evolution in texture of metal and sulfide relations from types 3 to 6, characteristic of thermal metamorphism. Yet, amoeboid metal-sulfide boundaries in type 3 compared to sharp ones in type 6, chondrules surrounded by a metal crust in type 3, and occurrence of metal-sulfide grains inside chondrules seem to reflect pristine reactions, prior to metamorphism. This study investigates mineral paragenesis and provides up to date siderophile element distribution among metal, sulfide and silicate phases. Particular attention will be paid to the partitioning of germanium (Ge), a moderately siderophile and volatile. Combining these data with previous studies on Ge isotopic composition in ordinary chondrites [4] would bring new insight on how metal of OC formed and evolved.

We have studied eight H ordinary chondrites from types 3 to 6. Elemental data have been collected by LA-ICP-MS, and germanium isotopic data by MC-ICPMS Neptune*Plus* (CRPG-Nancy) [5]. We report new data on siderophile elements, from each OC phases and emphasizes the link between ordinary chondrite and iron meteorites.

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