PROTOPLANETARY DISK COMPONENTS CONTAINED IN CO CARBONACEOUS CHONDRITES.

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Introduction: CO carbonaceous chondrites are highly unequilibrated meteorites formed by small, closely-sized chondrules, metal grains, and CAIs with about 200-300 µm in size that are set in a dry, olivine-rich matrix with little metal grains. Some COs like e.g. Allan Hills 77307 are among the most chemically heterogeneous and highly unequilibrated materials [1]. ALHA 77307 experienced minimum parent body metamorphism, but still chondrule mesostases have undergone aqueous alteration [2]. Other evidence of hydrous action comes from dark inclusions (clasts) found in Kainsaz, Ornans, Lance and Warrenton [3]. CO chondrites are particularly relevant in an astrophysical context as their rock-forming minerals could be in a pristine stage being representative of protoplanetary disk materials. The CO group contains little metal grains in the interstitial matrix, or inside glassy silicate chondrules, but some FeO-rich chondrules are present. The percents and mineralogy of these components provide clues on their setting location.

Technical procedure: Three sections of Antarctic CO chondrites were used for this study (Table 1). We selected COs with different petrologic subtypes to better understand the effect of thermal metamorphism in changing mineralogy. High-resolution mosaics of the sections are created from separate 50X images taken with a Zeiss Scope petrographic microscope to identify the components by other techniques: SEM+EDS, polarizing petrographic microscope, and micro-Raman techniques.

Name	Petrologic Subtype	TKW (kg)	Fall / find (year)
ALHA 77307	CO3.0	0.18	Find(1977/8)
ALH 82101	CO3.4	0.03	Find (1982)
ALHA 77003	CO3.6	0.78	Find (1977)

Table 1. List of CO Antarctic chondrites studied.

Discussion: A big diversity of materials composes the CO group of chondrites. The chondrules are mineralogically diverse and set into a fine-grained porous matrix in which large refractory inclusions are also common. The chondrule/matrix complementarity seems altered by thermal metamorphism [4]. That complementarity suggests that the CO formed from materials constrained to a local protoplanetary disk region in short timescales. Being in the inner disk, their components probably accreted dry, but were briefly hydrated in the parent body. Ulterior impact processing produced the fragments found in the matrix.

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