Goldschmidt 2025 Abstract
https://doi.org/10.7185/gold2025.28349

Mineralogical and geochemical investigation of two carbonaceous chondrites: preliminary results constraining their formation conditions

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Among all the meteoritic material, carbonaceous chondrites represent fundamental natural sampling of undifferentiated bodies, and provide essential information about the evolution of the early solar nebula and the subsequent planetesimal formation.

Their early formation ensures the preservation of the initial compositional features typical of the parent bodies they derived from[1], and that characterised their belonging to a specific group. The occurrence of mineralogical and chemical similarity among the different groups yields to the distinction of clans such as those of CV-CK and CR-CH-CB.

This study, developed in the framework of the Space It Up! project funded by the Italian Space Agency (ASI), and the Ministry of University and Research (MUR), focuses on the mineralogical petrological and chemical analysis of two already classified chondritic meteorites, NWA 7317 (CR6) and NWA 4966 (CK4) to assess their attribution. NWA 7317 has been the subject of few studies in literature[2], which proposed its pairing with other meteorites of the CR group (NWA 2994, NWA 3250, NWA 6901 e NWA 6921)[3,4], while NWA 4966 has only fragmentary data available.

Their mineral chemistry and texture are in agreement with the classification although the NWA 7317 in particular also showed features of equilibration at higher temperatures than those reported for the CR6 type.

In order to better constrain their characteristics and further investigate the processes responsible for their formation we combine mineralogical and geochemical (elemental and Cr isotopes) data to be further compared with the literature. With respect to previous studies, which relied on a limited number of analytical observations, this research allowed to improve the precision and the interpretation of the characteristics of these meteorites providing a significant contribution to the knowledge of the CK and CR classes.

[1] Gattacceca et al. (2020), *Earth Planet. Sci. Lett.*, 547 116467.

[2] Ruzicka et al. (2015), *Mt.Bul.*, 102.

[3] Irving et al. (2014), *45th Lunar Planet. Sci. Conf.*, 2465.

[4] Abe & Mikouchi (2019), *82th An. Meet. Meteor. Soc.*, #6130.