XRD Analysis of Crystal Structure of the Fragment of the Campo Del Cielo Meteorite

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Meteorites are the key, and often the only source of information about the pre-planetary and planetary early history of our solar system [1]. Currently, the following classification of meteorites: stone (aerolites) stoney-iron (siderolites) and iron (siderites), depending on the ratio of silicate minerals in them, and nickel-iron [2].

X-ray analysis was investigated of the fragment of iron meteorite Campo del Cielo, measuring 1.5 cm by 2 cm, weighing 13.55 grams. The crystal structure of the samples were examined for general purpose diffractometer «DRON-3» by powder method with copper radiation (Cu Kα). Survey was carried out in the range of angles from 10° to 100°.

It was found that the basis of the structure of meteorite Campo del Cielo is native iron of cosmic origin – a compound of minerals kamacite (Fe,Ni) and taenite (Fe, Ni). There are also the inclusions of minerals phase: troilite FeS, sphalerite ZnS, daubreelite FeCr\textsubscript{2}S\textsubscript{4}, alabandite MnS – group of sulphides; enstatite (Mg,Ca)SiO\textsubscript{3}, hedenbergite CaFeSi\textsubscript{2}O\textsubscript{6}, pigeonite (Ca,Fe)\textsubscript{2}Si\textsubscript{2}O\textsubscript{6}, olivine (Fe,Mg,Mn)\textsubscript{2}SiO\textsubscript{4}, plagioclase (Ca,Na)(Al,Si)[AlSi\textsubscript{2}O\textsubscript{8}] – silicate group; graphite C, chromite FeCr\textsubscript{2}O\textsubscript{4}, cohenite Fe\textsubscript{3}C and schreibersite (Fe,Ni)\textsubscript{3}P.