

Impact cratering model of the Chelyabinsk meteoroid formation

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Chondrite Chelyabinsk is unique meteorite due to its fall, structure and influence on people and science. It is ordinary chondrite LL5 S4 W0, however, it contains few different lithologies [Galimov 2014; Badyukov 2015; Grokhovsky 2014; Righter 2015].

As it is known, light and dark lithologies are of identical LL5 composition [Galimov 2014; Kohout, 2014]. Probably, all lithologies have same initial matter.

After the study of Chelyabinsk fragments it was found:

- All mentioned lithologies were present in large samples;
- Large brecciated samples contained roundish light lithology parts;
- Individual large light lithology samples had slickensides;
- Dark lithology was the result of shock darkening, it contained melted metal and troilite impact veins;
- Dark lithology could be found in the form of individual samples, as dykes and as main mass encapsulating light lithology parts in large samples;
- Large parts of dark lithology were adjoined with melted parts.

All three different lithologies are results of Chelyabinsk parent body complicate shock history. We suppose that Chelyabinsk breccia formation mechanism was similar to the impact cratering. The structure of main Chelyabinsk fragment looks like suevite structure from impact craters [Stoffler 2013].

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