Meteorites, and their basic implications for the origin of Earth

Chondrites are stony (non-metallic) meteorites that have not been modified due to melting or differentiation of the parent body.\textsuperscript{[1][2]} They are formed when various types of dust and small grains that were present in the early solar system accreted to form primitive asteroids.

One of their characteristics is the presence of chondrules, which are round grains formed by distinct minerals.

An achondrite\textsuperscript{[1]} is a stony meteorite that does not contain chondrules.\textsuperscript{[2][3]} It consists of material similar to terrestrial basalts or plutonic rocks and has been differentiated and reprocessed to a lesser or greater degree due to melting and recrystallization on or within meteorite parent bodies.\textsuperscript{[4][5]} As a result, achondrites have distinct textures and mineralogies incisive of igneous processes.\textsuperscript{[6]}

Iron meteorites are meteorites that consist overwhelmingly of an iron–nickel alloy known as meteoric iron that usually consists of two mineral phases: kamacite and taenite. Iron meteorites originate from cores of planetesimals.\textsuperscript{[2]}

Particles that were never melted – an agglomeration of primitive stuff

Implications for the origin of Earth:

The stuff of an early planet, like Earth as it first condensed in the solar nebula

Material that must have been melted to give the present igneous texture.

The stuff of a planet after melting, and resultant segregation by mass, to make an iron-nickel core and silicate mantle like those of Earth.

Material that must have been melted to differentiate/separate iron and nickel