

How fast did some chondrites accrete?

Metzler K., Institut fuer Planetologie, Wilhelm-Klemm-Str. 10, 48149 Muenster, Germany

Many unequilibrated ordinary chondrites (UOC's) contain a specific type of chondritic rock which is characterized by close-fit textures of interlocking deformed and undeformed chondrules. This rock type, termed "cluster chondrite", occurs as lithic clasts with sizes up to 10 cm. It seemingly formed by the accretion of freshly formed hot and viscously deformable chondrules within hours to a few days after chondrule forming events. This time constraint is based on the known cooling rates for chondrules, which leave only this small interval for viscous chondrule deformation. The chemical and oxygen isotopic compositions of cluster chondrites and their chondrules are similar to UOC literature data. Cluster chondrites apparently formed from the same material as other UOCs, but seem to have preserved a very early state of chondrite accretion. Studies by others revealed that the retention of Na and other volatile elements indicate UOC chondrule formation in dust-rich environments with high ambient gas pressures. Some authors explain those conditions by the collision of solid or molten planetesimals. In this context chondrules from cluster chondrites could be interpreted as molten droplets formed in the corresponding impact plumes.