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Inisight into planetary groth: Influence of high temperatures on chondritic material

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Planetary growth in protoplanetary disks starts with dust particles colliding, sticking to each other and growing in size up to the cm-range. Further accretion in this range is hindered by bouncing and fragmentation of colliding agglomerates. The growth of planetesimals above the so called "bouncing barrier"is still not fully understood. Compositional and concomitant structural changes induced by high temperatures in the vicinity of the protostar might explain improved sticking even beyond the bouncing barrier.
As meteorites contain primordial phases representing the material in our young solar system, studying their properties can give insight into the processes of planetry formation. To simulate conditions in protoplanetary disks we heated chondritic material up to 1400K in vacuum. Via ^{57}Fe Mössbauer spectroscopy and synchrotron powder x-ray diffraction thermal changes of magnetic, compositional and structural changes were investigated.
We observe a decrease of iron oxide content with high temperatures up to a point where only iron bearing silicates can be found in the material. These modifications of chondrites can alter their potential for future planetesimal formation.

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