Meteorite paleomagnetism constrains the early stage of protoplanetary disk

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Magnetic fields in the early solar nebula may have strongly influenced the transfer of mass and momentum inward and outward in the protoplanetary disk. Our custom-made scanning magnetic microscope and magnetotactic bacteria identify magnetic minerals responsible for their natural remanet magnetization (NRM) of individual grains in chondrites. The results on primitive ordinary chondrite (NWA1756, LL3.1) showed that not all of the metallic grains but part of the grains carry the remanent magnetization in the chondrite. This heterogeneous distribution of remanence, as well as its paleomagnetic intensity provides the constraint the large-scale mass transfer at the early stage of the protoplanetary disk.