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Petrologic types of fossil meteorites determined by synchrotron radiation X-ray tomographic microscopy (SRXTM)

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Most fossil meteorites (FM) known today have been recovered from mid-Ordovician marine limestone from Sweden. They are the pseudomorphosed remains of L chondrites that fell within ~2 Ma after the disruption of the L chondrite parent body (LCPB) ~470 Ma ago [1]. Previous work used the size of (pseudomorph) chondrules, and relict chromite grains to determine petrologic types (L3 – L6) of FM [2]. Since 2008, new FM have been recovered from beds higher up in the stratigraphy. We determine the petrologic types of 12 FM, which are less well preserved than other FM described earlier, e.g. no chondrule structures are visible. We apply a new developed method analysing silicate inclusions in chromite grains by SRXTM [3]. The abundance of lower petrologic types in the new FM is intermediate between the abundance among FM from older sediments, and recent falls, indicating a rapid evolution of the debris cloud after the LCPB disruption.

[1] Schmitz, B., et al. (2001) EPSL 194, 1-15. [2] Bridges, J.C., et al. (2007) MAPS 42, 1782-1789. [3] Alwmark, C., et al. (2011), MAPS 46, 1071-1081.

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