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Bulk analysis of meteorites and micro-meteorite candidates using INAA at the research reactor FRM II

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Methods have been developed for the analysis of small samples from potential extraterrestrial origin using instrumental neutron activation analysis (INAA) without any chemical treatments at FRM II [1], as was shown on the example of the Cloppenburg meteorite last time. Recently, we investigated an iron meteorite found in Libya. The results show high contents of Ni and Ir, but low amounts of Ga, and thus it was categorized as type IVB. Magnetic spherules were collected at ANU (Canberra, Australia) on a rooftop as potential micrometeorites [2] and analyzed. In spite of their small amounts (diameters about 200 µm and masses of 9–38 µg), more than 20 elements, including a few REEs, could be determined. The samples' Fe content is about 65 %, while the amount of Ni and Ir – both indicators for an extraterrestrial origin – are below the detection limit, implying an anthropogenic origin. Acknowledgement: BMBF project 05K16KTB, Silke Merchel, Dieter Heinlein.

[1] Li, X. et al., (2014), JRNC 300, 457-463

[2] Genge et al., (2017), Geology 45, 119-122

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