THE DISCOVERY AND STUDY OF COSMIC DUST IN GRANITES

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The well-known Yangjiazhangzhi multimetallic field is located near the city of Jingxi in Liaoning province. It is surrounded by Archean migmatitic gneisses and granites of Jianpin group (U-Pb age: 2437 My) which were then intruded by Yanshanian granites of three periods with ages of 190-172, 162-136, and 136-100 My, respectively. Late granite outcrops inside early ones form a granitic complex body which is younger in the central part and older in the outer part.

Within these four-staged granites, weakly magnetic iron-balls have been found in the four-staged granites mentioned earlier. They are primarily spherical in form, but some are spindle or tadpole shaped, with diameters of about 0.2 mm and of a laminated or zoned crustic structure. The fused crust consists of wuestite and a few magnetite, pyrite, and transparent minerals. Its metal-core is mainly composed of kamacite, $\alpha$-iron ($\alpha$-Fe), and possibly taenite. According to microprobe and neutron activation analyses, the elements in the melting-crust are predominantly Fe and less Mn, Cr, Ca, Mg, Si, Al, Na, and in the metal core are Fe, Ni, Co, and rarely Mn. Trace elements include Ir, Au, Sb, As, Sc, Th, Cr, K, and Cs. In addition, values of the Ni/Fe, Co/Fe, Ir/Fe, and Au/Fe ratios all indicate an extraterrestrial origin. The Ir/Au ratio (0.2-5.85) is also characteristic of cosmic material (Ir/Au=3.3). We can conclude, therefore, that the magnetic iron-balls in the Yangjiazhangzhi granites are micrometeorites or meteoritic granules. This has been viewed and proven by the famous Chinese expert Ouyangzhiyuan. In addition, the authors have found the same type cosmic debris in granites south of China.