anomaly patterns observed in the high-Z elements, the close association of isotopically normal He and Ne with the r- and p-products of Xe, the absence of He and Ne in the noble gas component with $^{136}Xe/^{132}Xe = 0.31$, the existence of isotopically anomalous high-Z elements in a matrix of isotopically normal carbon, or the presence of isotopically anomalous Xe in the solar wind.

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SILICON IN CARBONACEOUS CHONDRITE METAL: RELIC OF HIGH-TEMPERATURE CONDENSATION

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In Type 2 carbonaceous chondrites, metal grains are almost exclusively contained within olivine crystals. Their small sizes and occurrence within olivine normally preclude electron microprobe determination of Si in them due to excitation of surrounding silicates which yields spurious Si contents. We discovered, however, a large, 254 μm $\times$ 361 μm, metal grain surrounded by the matrix phyllosilicates in Murchison. It was extracted and cleaned of adhering silicates. Analyses of 23 different spots on this grain gave an average of 0.24 ± 0.04 mole % Si.

Grossman and Olsen (1974) reported that the usual chemical characteristics of the metal grains inside the olivines of these meteorites, high Cr contents and higher-than-solar Ni/Fe and Co/Fe ratios, can be explained in terms of solar nebular condensation and fractionation processes. The grain studied in this work has Ni, Co and Cr concentrations within the respective ranges for these elements in the metal grains within olivine. Thus, we conclude that, despite its different occurrence, this metal grain belongs to the same population of unique grains inside olivine and that not all of the Si detectable in the latter grains by electron microprobe is spurious. To model the variation with temperature of the composition of metal in equilibrium with a solar gas, we performed updated condensation calculations in which the non-ideal solution of Ni, Cr and Si in Fe was taken into account. We found that the Si content of the grain studied here can be explained by this model if it stopped equilibrating with the gas at T > 1200 °K and $10^{-5} \lesssim P_{tot} < 10^{-3}$ atm. Further, Si contents such as this are a natural consequence of condensation under the reducing conditions which prevail in a gas of solar composition at high temperature. Continued equilibration to lower temperatures, however, reduces the Si content considerably, erasing this record of previous reducing conditions.

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LITHOLOGIC CONTENT AND GRAIN SIZES OF THE "BUNTE BRECCIA," RIES CRATER, GERMANY

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A shallow core drilling program was performed in the S-Vorries to evaluate the lithologic content of the Ries' "Bunte Breccia" and the relation thereof to the well known pre-impact stratigraphy (Hörz *et al.*, 1977). The 9 core sites studied were between 16.5 and 37 km from the impact center, *i.e.*, at radial ranges from ≈ 2 to 4.5 r. The contents (wt %) of distinct lithologies from known stratigraphic positions vary among the cores as follows: Crystalline basement (CRY; < 600 m deep): 0.002 to 0.273; Triassic (TRI; ≈ 400 to 600 m) 0.028 to 5.83; Lower and Middle Jurassic (LMJ; ≈ 250-400 m): 0.93 to 13.65; Upper Jurassic (UJ; ≈ 0 to 250 m): 7.62 to 90.79; Tertiary components from predominately outside the crater cavity: 6.93 to 90.22. The average of all cores is: CRY = 0.05; TRI = 0.77; LMJ = 2.4; UJ = 36.6; TER = 60.2. Detailed grain size analyses yielded the following variations (% wt) from core to core, with the average in parenthesis: < 63 μm: 2.92 to 48.01 (21.35); 63-125 μm: 0.35-5.7 (2.89); 125-250 μm: 0.37 to 9.74 (3.97); 250-500 μm: 30 to 4.03 (2.06); 500-1000 μm: 0.25 to 1.95 (1.05); 1-2 mm: 0.27 to 2.07 (0.83); 2-4 mm: 0.03 to 2.24 (0.81); 4-10 mm: 0.68 to 3.62 (2.52); 1-2 cm: 0.17 to 3.88 (1.64); 2-4 cm: 0.27 to 4.68 (2.63); 4-8 cm: 0.50 to 5.68 (2.99); 8-16 cm: 1.37 to 18.03 (5.36); 16-32 cm: 1.21-9.93 (2.84); 32-64 cm: 1.35 to 11.51 (4.69); 64-128 cm: 0-12.93 (4.50) and > 128 cm: 0-86.72 (39.87). There is large variability within individual cores as well as among cores.

These observations are compatible with an ejecta deposition process in which primary crater ejecta in ballistic trajectories provide the kinetic energy to trigger a ground-hugging debris surge of intimately mixed primary and secondary ejecta. Therefore, observations attesting to ground-hugging flow regimes are not diagnostic for a purely nonballistic deposition mechanism (Chao, 1977).

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