The fusion crust of Moore County was removed and the surface was abraded to a depth of one cm before a sample was taken, from which a three point "isochron" was established (WR, Plag, Px). The data define a line corresponding to $\sim 4.5 \times 10^9$ yr which misses both the blank and primordial Pb. The linearity of the data is preserved on an $^{208,207,206}Pb$ diagram, thus indicating the strong possibility of a mixing line dominated by a terrestrial contamination (of a composition somewhat different from the blank) which extended below the fusion crust into the interior. Samples from greater depths are being investigated.

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A PETROGRAPHIC AND Mg ISOTOPIC STUDY OF CAI IN BALI (C3V) AND COOLIDGE (C4V)

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One of the least well understood and most controversial aspects of CAI is the degree to which their mineralogical, chemical and isotopic composition has been affected by alteration and metamorphism. Coolidge is a highly metamorphosed carbonaceous chondrite, the only C4V (Van Schmus, 1969) and we have begun a petrographic and Mg isotopic study of Coolidge CAI to investigate the extent of chemical and isotopic reequilibration during thermal metamorphism. We also present the first Mg isotopic results from a coarse-grained CAI from Bali (C3V).

Three inclusions exhibiting bright blue luminescence were identified in a slab of Coolidge; two are comprised solely of fine-grained phases. Coolidge 1 is an amoeboid-shaped object ~ 1.5 cm in diameter, comprised largely of mm-sized clusters of 5-10 μm, euhedral Fe-spinel ($\sim 10\%$ FeO), fine-grained anorthite (An 99-100), silicate glass with 1% Na_2O and accessory apatite. Coolidge 3 is oblong (1.5×3 mm) and comprised mainly of fine-grained Ca-Al-rich, Fe-poor silicate containing 10×100 μm anorthite laths (An 97-100), small Fe-rich spinel and fassaite (3.5% TiO_2). Coolidge 1 and 3 are similar to Type IV chondrules in Vigarano (McSween, 1977). Coolidge 2 is a spherical inclusion, 0.5 cm across, texturally reminiscent of Allende Type B1 CAI. An interior of coarse-grained fassaite $(Ca_{1.0}(Mg_{.44}Ti_{.28}V_{.01}Al_{.26})(Si_{1.4}Al_{.6})O_6)$ with poikilitic Fe-rich spinel $((Mg_{.77}Fe_{.21})(Cr_{.01}V_{.01}Al_{2.0})O_4)$ and rare anorthite (An 99-100) is surrounded by a fine-grained Fe-, Ca-, Al-rich silicate mantle $(Na_{.01}Ca_{.69}Fe_{.52}Mg_{.10}Cr_{.04}Al_{1.64}(Al_{.31}Si_{1.69})O_8) \sim$ 0.5 mm wide. Several features of Coolidge 2 suggest that it was initially a Type B1 CAI: (1) the radially zoned structure in which the original melilite mantle has been replaced by fine-grained silicate; (2) the similarity in composition between Coolidge fassaite and anorthite to their Allende counterparts; and (3) the textural relationship between primary fassaite and anorthite and secondary fine-grained silicate. The complete absence of melilite implies that all melilite and most anorthite initially present were destroyed during open-system metamorphism in the Coolidge parent body and replaced by fine-grained, Fe-rich silicate. The relatively high abundance of Cr in Coolidge 2 may reflect exchange with Coolidge matrix which is enriched in Cr_2O_3 (McSween and Richardson, 1977). The Mg isotopic composition of an interior anorthite was measured with PANURGE. The anorthite is extremely Mg-deficient and contains only normal Mg: $\delta^{26}Mg = 6 \pm 15‰$ with $^{27}Al/^{24}Mg = 2500$, giving $^{26}Mg^*/^{27}Al < 1 \times 10^{-6}$, consistent with isotopic reequilibration during metamorphism.

Kurat *et al.* (1975) described a 1 cm diameter, coarse-grained CAI texturally very similar to Allende B1 CAI. Ion probe isotopic measurements of interior plagioclase show a large ^{26}Mg excess, δ^{26}Mg = 74 ± 10‰, with ^{26}Al/^{24}Mg = 255. Together with Mg of normal isotopic composition measured in fassaite, the data define a linear array with slope ^{26}Mg*/^{27}Al = $(4.3 \pm 0.5) \times 10^{-5}$, indistinguishable from that found in Allende B1 CAI (Huneke *et al.*, 1983). These data suggest that B1 CAI from different meteorites form a petrographically distinct group characterized by ^{26}Mg*/^{27}Al ~ 5×10^{-5} and may have originated from a common source. The number of meteorites containing excess ^{26}Mg is now five: Allende, Bali, Leoville, Murchison and Dhajala — but the total abundance of ^{26}Al in the solar system remains unclear.

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SYSTEMATIC STUDIES OF ^{10}Be AND ^{26}Al PRODUCTION IN METEORITES: SIMULATION BY ISOTROPICALLY IRRADIATED METEORITE MODELS

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In 1982 a series of three simulation experiments with essentially new features was started at CERN. The purpose of our experiments was to simulate the isotropic irradiation of meteorites in space by rotating spherical models with different radii in a high energy proton beam. A detailed description as well as results for short-lived products have been published by Michel *et al.* (1984). Measurements of long-lived isotopes have been carried out in targets of the first experiment (R = 5 cm). ^{10}Be was measured by AMS at Rutgers, whereas the AMS-determination of ^{26}Al was performed at the University of Pennsylvania. The resulting depth effects for these nuclides are summarized in Table 1 together with data for the short-lived isotopes ^{7}Be, ^{22}Na and ^{24}Na. Low-energy spallation products increase by a factor of 10-20% from the surface to the center due to secondary production. High-energy products like ^{10}Be — however — show no overall depth dependence. As calculated from theoretical considerations pure primary production of these nuclides would result in an approx. 15% decrease with respect to the surface production (Michel, 1985). Thus the flatness of the considered profiles must be attributed to secondary production effects, which are apparent even in high-energy spallation reactions. The absolute production rates for ^{10}Be from O, Mg, Al, and Si as well as for ^{26}Al from Si are shown in Figures 1 and 2. According to the reaction Q-value the production of ^{10}Be from O is by a factor of 3-4 higher than from the other target elements. ^{26}Al in Si-targets as a low-energy product is produced 20 times more frequently than ^{10}Be in the same targets. The secondary production increase in the center of the meteorite model exceeds 20% with respect to the surface value.