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CORRECTION

Natural occurrence of silicon carbide in a diamondiferous kimberlite from Fuxian

Irene Leung, Wenxiang Guo, Irving Friedman & Jim Gleason

Nature **346**, 352-354 (1990).

THIS letter as printed in the 26 July issue contained some errors in the last two paragraphs (page 354) such that in places carbon-13 should read carbon-12 and vice versa. The section affected by this error is reproduced here:

Isotopically zoned but non-coated diamonds^{23,26} show variations in ¹³C from core to rim of only about 4%. We suggest that the 20‰ fractionation observed between SiC and diamond is due to a distillation process: preferential uptake of ¹²C during the growth of SiC enriched the carbon reservoir, in which the diamond later grew, in ¹³C. Evidence that the SiC was formed first is provided by the presence of SiC inclusions in diamonds from Fuxian¹³. To explain the preferential uptake of ¹²C by SiC, we examined the thermodynamic properties (1 atm) of diamond²⁷ and 6H SiC²⁸ and found that SiC has much higher enthalpy and entropy than diamond. Deines²⁹ noted that in an isotope exchange reaction, the solid of lower heat capacity can be correlated with higher vibrational frequency and a stronger tendency to incorporate the heavy isotope. This suggests that SiC should be enriched in ¹²C and diamond in ¹³C, as we observe.

In studies of iron meteorites^{30,31}, systematic ¹³C enrichment in graphite and ¹³C depletion in cohenite (iron carbide), in 12‰ fractionation at ~600 °C was observed, and the fractionation was expected to increase with increasing temperature. The ¹³C-¹²C systematics observed in our SiC-diamond system is completely analogous. Our isotope data imply that the carbon reservoir in the mantle beneath Fuxian has a $\delta^{13}\text{C}$ value between -24‰ and -4‰, and is probably much lower than -5‰, a value derived from isotope analysis of natural diamonds. A more precise estimate would require a knowledge of all fractionation processes and the number of carbon-bearing phases participating in the isotope exchange reaction. □

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