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SILICATES IN THE CARLTON (IIIC) IRON METEORITE AND POSSIBLE RELATIONS TO GROUP IAB

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In spite of their similarity to group IAB, iron meteorites of group IIICD do not normally contain abundant silicates. However, silicate-rich areas are present in some samples of the Carlton (IIIC) iron meteorite. The silicates present are olivine, enstatite, and plagioclase. They occur as (a) polymineralic clusters up to several mm in size, (b) subhedral to rounded grains, separated from the iron matrix by a rim of radially crystallized graphite, and (c) small fragmented grains in sulfide. As can be seen from Table 1, compositions of olivine and enstatite are similar in Carlton and group IAB silicates, but plagioclase is more albitic, and somewhat variable in composition. Olivine shows zoning similar to some Campo del Cielo inclusions (Wlotzka and Jarosewich, 1975). No other oxygen-bearing minerals have as yet been found in Carlton. Dayton (IIID) is the only other member of group IIICD from which silicates have been described, consisting of albitic plagioclase, enstatite, and SiO_2 in a phosphate matrix (Scott and Bild, 1974).

Table 1
Average composition of olivine, orthopyroxene and plagioclase from Carlton silicate inclusions (preliminary results)

	Olivine	Enstatite	Albite
SiO_2	42.1	58.4	69.2
TiO_2	0.02	0.19	0.03
Al_2O_3	–	0.16	19.1
Cr_2O_3	–	0.05	–
FeO	6.5	6.5	0.95
MnO	0.14	0.18	–
MgO	52.2	36.2	–
CaO	–	0.79	0.87
Na_2O	–	0.02	10.2
K_2O	0.02	–	0.62
Total	100.98	102.49	100.97
Fe	6.5	9.0	–
Mg	93.5	89.6	–
Ca	–	1.4	4.3
Na	–	–	92.1
K	–	–	3.6

The absence of clinopyroxene and chromite from the silicate inclusions is reflected in their bulk composition (determined by broad-beam microprobe technique) by a depletion of Cr, Mn, and Ca relative to ordinary chondrites (metal-free basis). Similar trends on a much smaller scale are found in IAB silicate inclusions. A comparison of trace element data (Scott and Wasson, 1975) also suggests that trends in group IIICD are very similar to but more pronounced than in group IAB. Thus the two groups may either be derived from the same parent body, or from very similar parent bodies which presumably formed in the same region of the solar system.

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A NEW TYPE OF Ca-Al-Na-RICH INCLUSIONS WITH AN IGNEOUS TEXTURE IN THE LANCÉ CARBONACEOUS CHONDRITE

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Three inclusions of an apparently new type have been found in the Lancé carbonaceous chondrite (no. 2LN, 3A1, and 5B). They are well-delineated aggregates with a groundmass that is granular in some places, but resembling an ophitic igneous texture in others. Patches of metal and sulfides are present along the rim and occasionally within the inclusions. The granular groundmass consists in all three cases of very pure enstatite (en > 97). In addition, inclusion *2LN* contains ophitic feldspar (an 73), occasionally together with nepheline, and a very intimate intergrowth of Ca-rich pyroxenes, with skeletal hedenbergite or ferrosalite (en 10-25, fs 30-40, wo 45-50) embedded in augite (en 53, fs 3, wo 44). The augite is remarkable for its high Mn content (Mn/Fe – ratio about 1), and analyses give low cation sums unless most Ti and Cr are converted to Ti (3+) and Cr (2+). Hercynitic spinel (Fe/(Fe + Mg) = 0.6 and Cr_2O_3 around 1.3 wt %) surrounded by nepheline, and minor olivine of variable composition (fa 9-33) are also present. The bulk composition is alkali olivine basaltic (8% normative nepheline). Inclusion *3A1* does not contain nepheline or hercynite, but the other phases are generally similar to inclusion 2LN, except that olivine is more fayalitic (fa 40-60). Inclusion *5B* differs in some respects from the two others: The ophitic feldspar component is variable in composition (an 47-70), and there is only one Ca-rich pyroxene with very high Al_2O_3 (10 wt %). Olivine is more abundant and is strongly zoned (fa 8-32).