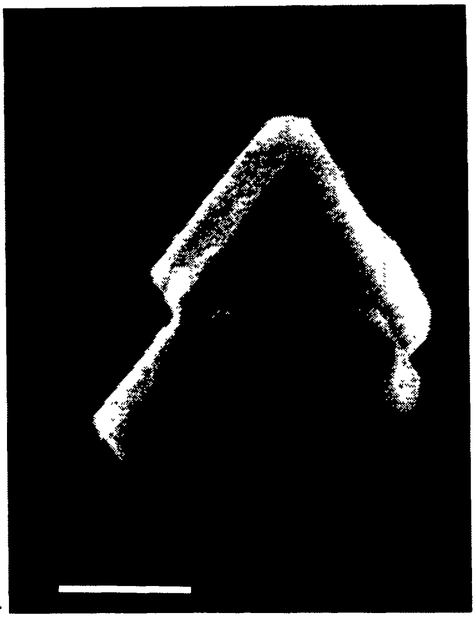

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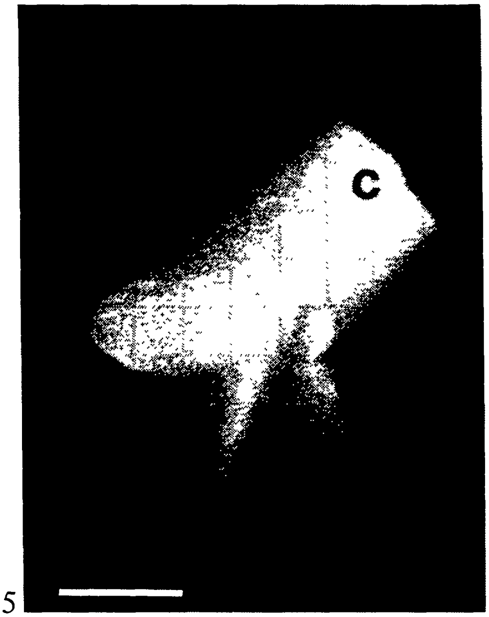

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Fig. 4 Kemaraj tektite. Magnetite-like group of crystals from Fig. 3. (Same conditions. Scale bar = 10 μm.)

Fig. 5 Kemaraj tektite. m: magnetite-like crystal associated with c: chalcopyrite-like crystal. (Sawn surface, SEM, reflected mode. Scale bar = 2 μm.)

and colour, and EMP-data show that at least two opaque mineral species or genera are present in the bubbles:

a) black, magnetite-like iron oxides, containing variable amounts of Ni, Cu and S (Figs. 2, 3 & 4).

b) yellow, chalcopyrite-like copper sulfides, containing variable amounts of Fe and Ni (Fig. 5).

Various crystallized silicates have also been observed in the bubbles, especially from impactites. In the Kemaraj tektites, which are relatively rich in bubble minerals, the volume ratios of the crystals to the bubbles vary from 1/300 to 1/3000. It is hypothesized that the opaque and transparent minerals result from the condensation of high density gases trapped in the bubbles. The composition and the amount of the bubble minerals offer perhaps a means to determine to some extent the composition and the density of the gases which concurred to produce the bubbles.

^{40}Ar-^{39}Ar DATING OF THE PUEBLITO DE ALLENDE METEORITE

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The Allende (C3) meteorite carries isotope anomalies[1,2,3] which may have been produced outside the solar system.[4,5] To provide a time frame for the evolution of the meteorite and its clasts, we carried out ^{40}Ar-^{39}Ar study of

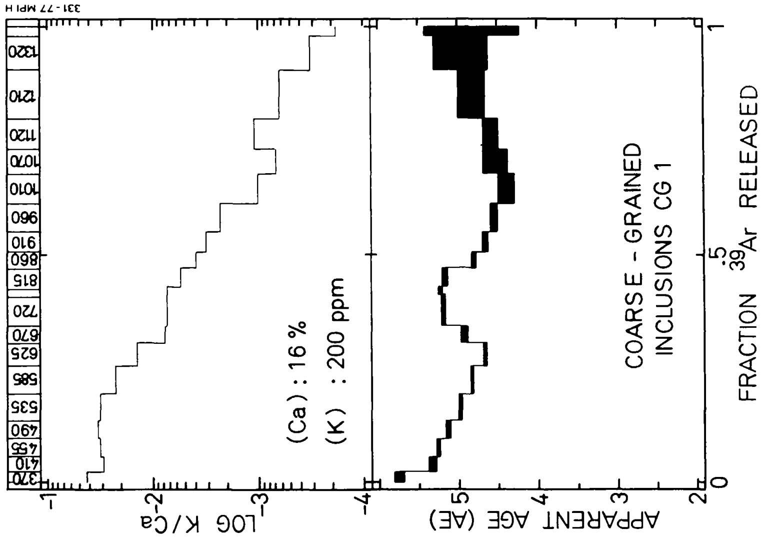

Figure 3

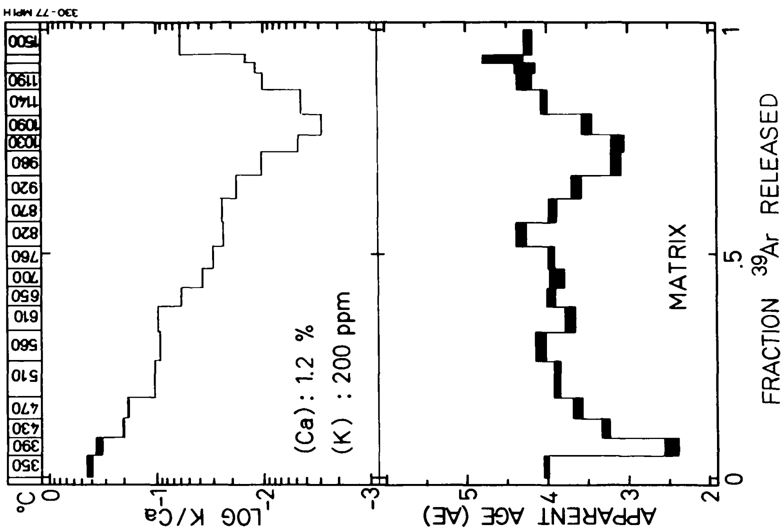

Figure 2

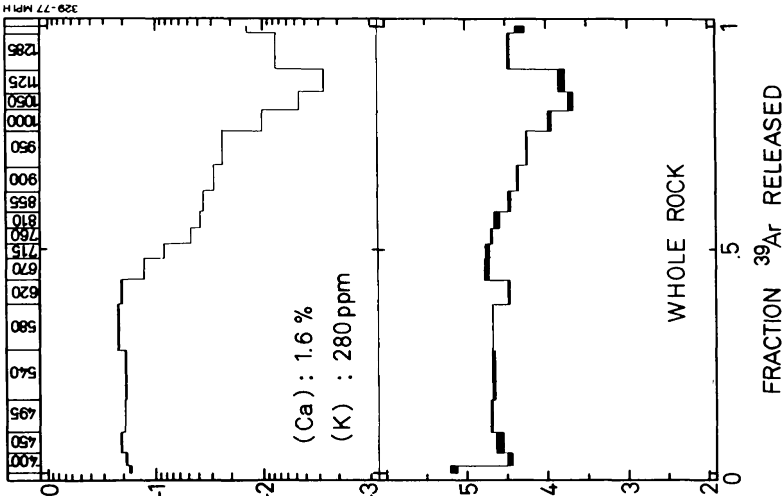

Figure 1

12 Allende samples: 1 whole rock (Fig. 1), 1 matrix (Fig. 2), 6 olivine chondrules, 3 fine-grained and 1 coarse-grained (Fig. 3) white inclusions. In calculating the ages no corrections for trapped and spallogenic contributions to ^{40}Ar were made because of the ubiquitous presence of a Cl-derived component. The corrections, however, are thought to be small. Some age spectra are disturbed by recoiling ^{39}Ar or some other Ar-redistribution process. Nine of ten clasts studied and a whole-rock sample have ages clustering at 4.62 AE (Fig. 4) which must be the time of a major K-Ar resetting in the history of the meteorite. Four clasts have well-defined plateau ages; K-Ar ages are shown for five others with complex, poorly understood release patterns. A later disturbance is suggested by the matrix age of 3.8 AE.

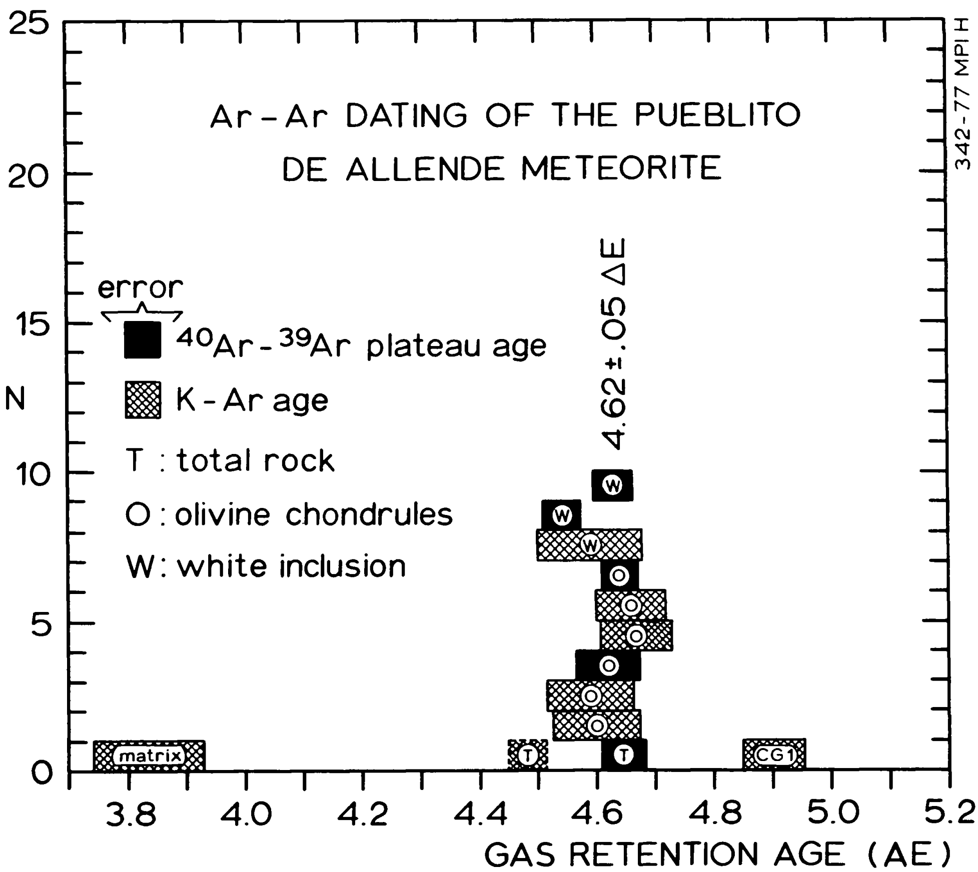

Figure 4

The remarkable 4.9 AE K-Ar of the coarse-grained white inclusions CG1 (Fig. 3) may be explained by

a) loss of 20% of ^{39}Ar, although no loss this large has ever been observed;
b) loss of 40% of K at 3.8 AE without *any* loss of ^{40}Ar;