SEARCH FOR Q IN SARATOV (L4)

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Introduction: Q, for quintessence, carries most of heavy noble gases in primitive meteorites [1]. It is most likely carbonaceous matter [2], however the exact nature remains elusive for over three decades. On the other hand, Q-gases in meteorites from various compositional types have been extensively studied [3,4]. Since Q is less susceptible to thermal metamorphism than presolar diamond [3], meteorites with a higher metamorphic grade (≥ 3.7) contain Q but not diamond. For this reason, we chose Sararov (L4) to study Q and its noble gases.

Experimental: We started from ~7.2 g of Saratov. First it was alternately treated HF-HCl and HCl to remove silicates. Then sulfur was extracted with CS_2. Noble gases in bulk Saratov and the HF-HCl residue AC were analyzed by step-wise heating and were already reported [5]. The Ne data points of AC lie on a mixing line between spallogenic Ne and Ne-Q in Saratov on a Ne 3-isotope plot. AC was subjected to colloidal separation, yielding the colloidal fraction AE and the non-colloidal fraction AF. AE is black, while AF is dark brown, suggesting that essentially all carbonaceous matter in AC was concentrated in AE (Fig. 1). AE was further subjected to two successive colloidal separations, yielding the colloidal fractions AG and AI, and the non-colloidal fraction AJ. Since AE is most likely devoid of spallogenic Ne, we will be able to precisely determine Ne-Q in Saratov from the daughter fractions of AE. If we assume all Xe in AC is concentrated in AE, from the mass balance, the ^{132}Xe concentration of AE is calculated to be $20{,}100 \times 10^{-10}$ cm^{3}STP/g. If further separations are successful, the Xe concentrations of one or two of the daughter fractions (AG, AI and AJ) can be even higher. We will report noble gas data on these colloidal and non-colloidal fractions.

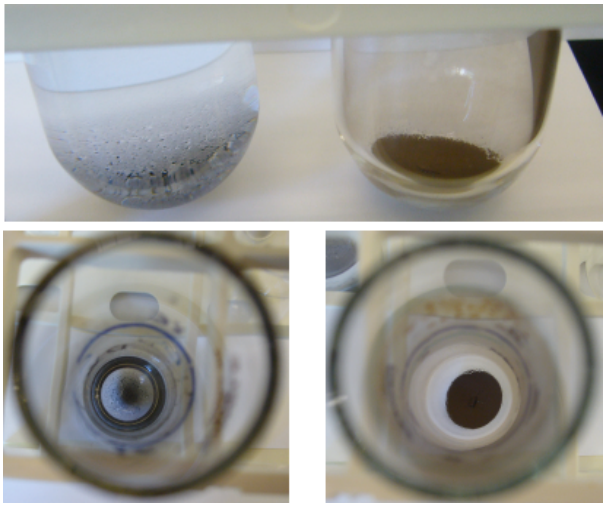

Fig. 1. Saratov fractions AE (left) and AF (right).

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