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Be-B chronology of the early solar system

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10Be decays to 10B with a half life of 1.5 m.y. From B isotopic studies of CAIs, It seems that 10Be was alive in the early solar system.

In chondrules, it is anorthite with large Be/B ratios, that can be used for the Be-B measurements. Anorthite-rich chondrules are commonly found in CO3 chondrites. Yamato82094, a CO3 chondrite, that contains a large number of anorthite-rich chondrules, was used for the present study.

It was found that there is a positive correlation between the Be/B ratios and the 10B/11B ratios. From the slope of the correlation, it is estimated that the age of chondrules may be slightly younger than the age of the CAIs. But, within the errors, it is also possible to interpret that both CAIs and chondrules were formed simultaneously.

10Be decays to 10B with a half life of 1.5 m.y. From B isotopic studies of CAIs, It seems that 10Be was alive in the early solar system. But, it is not well established because of the following reasons. 1) The B isotopic anomalies could be explained by B isotopic anomalies produced by galactic cosmic rays. 2) Al-Mg ages and Be-B ages do not correlated well and hence there is a possibility that the Be isotopic ratios were not uniform in the early solar system. However, as to the former argument, it is not clear why the cosmogenic B is to be found only in CAIs. As to the latter argument, it may be partly explained by large errors attached to some of the Be-B ages and it may be partly explained by differences in the diffusion rates of Mg and B. Therefore, there is no compelling reason to consider that the Be-B system does not work as a clock of the early solar system. Assuming that it works as a clock, we made Be-B measurements of chondrules. Because of the slow diffusion of B compared with Mg, it is expected to be a better clock of the early solar system compared with the Al-Mg clock.

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