

## **An improved extraction system to measure carbon-14 terrestrial ages of meteorites and pairing of the Antarctic Yamato-75097 group chondrites**

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We examined an improved system for extraction of carbon from meteorites using a vacuum-tight RF melting method. Meteorite samples mixed with an iron combustion accelerator including a specific amount of carbon (0.052%) were combusted in a RF furnace (LECO HF-10).  $^{14}\text{CO}_2$  extracted from the meteorite was diluted with a known amount of nearly  $^{14}\text{C}$ -free  $\text{CO}_2$  evolved from the iron accelerator on combustion. The  $^{14}\text{C}$  activities of the recently fallen Holbrook (L6) and Mt. Tazerzait (L5) meteorites were measured by this method. The mean value was  $56.5 \pm 3.0$  dpm/kg, which is similar to the values reported for recently fallen L6 chondrites.

Terrestrial ages were measured for four Antarctic meteorites:  $1.8 \pm 0.5$  kyr for Yamato (Y)-75097 (L6),  $1.8 \pm 0.5$  kyr for Y-75108 (L6), and  $0.1 \pm 0.1$  kyr for Y-74192 (H5). For Y-74190 (L6), an apparent age of  $0.8 \pm 0.5$  kyr, which is younger than the other samples, was calculated. The Y-74190 chondrite appears to have been irradiated at a deeper depth in the meteoroid than the other three samples on the basis of the  $^{22}\text{Ne}/^{21}\text{Ne}$  and  $^3\text{He}/^{21}\text{Ne}$  ratios, and it may have higher  $^{14}\text{C}$  saturated activity. With the  $^{14}\text{C}$  saturated activity corrected for shielding depth, we have the same terrestrial age, about 1.8 kyr, as that for the other Y-75097 group specimens. Hence the Y-74190 is confirmed to be paired with Y-75097, Y-75102, Y-75108, and Y-75271. The five samples Y-74190, Y-75097, and Y-75108, together with Y-75102 (L6) and Y-75271 (L6), have been reported to be paired and fragments of an L-chondrite shower. The result of this work and literature data for latter two samples confirmed that they are paired. On the other hand, the obtained terrestrial age of Y-74192 (H5) suggests that it could be a recently fallen meteorite. It is doubtful, however, that the value of 46.4 dpm/kg is suitable for the saturated  $^{14}\text{C}$  activity used in estimating the terrestrial age of Y-74192. More discussion and experimental work are needed for other recently fallen meteorites, both for L and H chondrites, and a correction for the shielding effect should be done to determine a more reliable terrestrial age.