RECENT ADVANCES IN CARBON-14, POTASSIUM-ARGON, AND RUBIDIUM-STRONTIUM GEOCHRONOMETRY

by
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Abstract

Recent analytical advances in carbon-14, potassium-40, and rubidium-87 dating have resulted in increased ranges and applicability of these methods to the dating of geologic events.

Carbon-14 dating now has been extended from modern to approximately 50,000 years as reported by Fergusson (New Zealand) and deVries (Netherlands). DeVries has recently enriched several samples using a thermal diffusion column and has reported that the limit with his apparatus is approximately 70,000 years. Although the effect of younger material as a contaminant to the sample is serious, any age would be minimum if not the true age.

Reynolds' (University of California) use of ultra high vacuum techniques for dating by the potassium-argon method has resulted in the assignment of apparent ages as young as several million years. Apparent ages less than a million years have been obtained. However, the extent of accuracy remains to be seen, and this problem is presently under investigation. Lipson has shown the rather excellent correlation that exists between assigned geologic ages and potassium-argon ages for some of the younger samples.

The rubidium-strontium method is not subject to the difficulty of argon leakage which can be the partial result of the re-heating of a given mineral. Thus, where possible, it is advisable to apply Rb-Sr and K-A measurements. This permits a more exacting evaluation of the absolute age as well as an understanding of the history of a given stratigraphic unit.

Thus, the previous gap that existed in the range of 40,000 years to 10×10^9 years for which no geochronometer was available has been considerably closed. One of the main limitations appears to be sampling rather than analytical techniques which are reproducible within a few percent.

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