Carbonic Anhydrase-Catalyzed Isotope Equilibrium for Oxygen Isotope Analyses of Aqueous Samples

This patent pending method reduces oxygen isotope equilibrium reaction time from 24h to <1h.

McMaster · Industry Liaison Office

Tech ID

19-020

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Patent Status

Patents pending.

Stage of Research

Experimentally verified.
Data is available upon request.

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Abstract

Oxygen isotope studies of aqueous samples are typically determined through the isotopic equilibration of CO_2 gas and H_2O. This equilibration process typically takes 24 hours in a closed undisturbed reaction vessel, limiting laboratory throughput.

The technique developed at McMaster utilizes carbonic anhydrase (CA) to rapidly catalyze the oxygen isotope exchange reaction, bringing the reaction time from 24 hours to less than one hour. This technique is compatible with commercially available CO2-H2O equilibration devices, and can be easily and immediately adopted by any laboratories that measure the oxygen isotope compositions of aqueous samples.

Applications

Oxygen Isotope analyses in fields such as:

- Environmental sciences: Geology, Hydrology
- Carbonate isotope analyses
- Biology
- Medical

Benefits

- Reduce equilibrium reaction time from 24h to <1h.
- Increase laboratory throughput capability.
- Compatible with existing commercially available equipment.