

# Experimental determination of nitrogen isotope fractionation associated with NH<sub>3</sub> degassing at low temperature

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Ammonia degassing is a common process in alkaline water systems, such as hydrothermal vents, soils, and farming lands. Nitrogen isotope fractionation factor is an important parameter to quantitatively assess the nitrogen cycle in these systems, but still not constrained yet.

In this study, we carried out laboratory experiments to examine the nitrogen isotope behavior after ammonia is partially degassed from an ammonium sulfate solution. The experiments can be described by the following reaction:  $\text{NH}_4^+ + \text{OH}^- (\text{excess}) \rightarrow \text{NH}_3 \cdot n \text{H}_2\text{O} \rightarrow \text{NH}_3_{(g)} \uparrow$ . Nitrogen isotope was analyzed on remaining ammonium. The results fit a Rayleigh distillation model, suggesting a kinetic isotope fractionation between gaseous ammonia and remaining ammonium in the solution. Modeling results gave a fractionation factor for ammonium degassing at room temperature.

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