

## **Photochemical synthesis of Ammonia and Amino Acids from Nitrous Oxide**

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Abiotic synthesis of ammonia and amino acids is crucial for the origin of life. We report results of experimental study on nitrogen photochemistry driven by solar UV irradiation. Our new experiment demonstrated that ammonia and several amino acids can be synthesized from a simple mixture of N<sub>2</sub>O, CO and H<sub>2</sub>O which could possibly mimic atmosphere on early Mars or Earth. The results showed that carboxylic acids, ammonia, methylamines, as well as amino acids were produced when the water is present. The product amino acids include glycine, serine, and  $\beta$ -alanine when UV was penetrated to the surface of liquid water. These results suggest that NH<sub>3</sub> can be synthesized by photochemistry in the atmosphere containing N<sub>2</sub>O, CO and H<sub>2</sub>O, and could be an important intermediate to produce the amino acids.