



Prebiotic synthesis of organic compounds (Miller, Urey, and successors)

Tungsten electrodes

5-liter flask

Condenser

500-cc flask

10 cm

Miller-Urey "classic" apparatus.  
Photo David Brigg,  
BBC Scotland via NAS

"Lightning"

Early O<sub>2</sub>-absent atmosphere(?) or volcanic gasses: H<sub>2</sub>O, CH<sub>4</sub>, NH<sub>3</sub>, H<sub>2</sub>  
Condensation;  
re-evaporation

PRODUCTS:  
glycine, α-alanine  
and β-alanine  
(among others)  
Combinations  
including H<sub>2</sub>S and/or  
HCN can yield > 20  
amino acids

Miller-Urey "volcanic" apparatus.  
Photo David Brigg,  
BBC Scotland via NAS





