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Objective

The building blocks of life, such as amino acids and nucleobases, are very well known to have been synthesized, starting from simple molecules containing hydrogen, carbon, oxygen, and nitrogen, in extreme conditions triggered by various processing. Previous reports suggest that the shock processing of simple molecules can lead to the synthesis of building blocks of life, such as amino acids too [1,2]. However, the fate and role of amino acids/nucleobases when they are subjected to similar processes largely remains unexplored [3]. Here, we aim to experimentally verify the shock processing of amino acids and nucleobases in a controlled laboratory environment, utilizing a shock tube. The results suggest that they polymerize to complex macroscale structure when subjected to shock within 2 ms timescale over post shock temperature of up to 8000K.

Shock processing: Experimental set-up

Objective

The tendency of amino acid towards the formation of complex macroscale structure provides evidence for the evolution of the building blocks of life under impact shock condition. Molecules such as amino acids/nucleobases are considered as important precursors of life. However, natural biological structures containing proteins or polypeptides or lipids, etc., which has a direct link with sustained biological evolution is still missing. In this perspective, our results have significant insights. These structures also provide a possible explanation for organized structures seen in meteorites [4]. Further investigations are being conducted, which will take us one step further towards our understanding of the origins of life and will help to bridge the gap between molecules and life.

References