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ACCEPTED MANUSCRIPT

Excess of L-alanine in amino acids synthesized in a plasma torch generated by a hypervelocity meteorite impact reproduced in the laboratory.

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We present a laboratory reproduction of hypervelocity impacts of a carbon containing meteorite on a mineral substance representative of planetary surfaces. The physical conditions of the resulting impact plasma torch provide favourable conditions for abiogenic synthesis of protein amino acids: We identified glycine and alanine, and in smaller quantities serine, in the produced material. Moreover, we observe breaking of alanine mirror symmetry with L excess, which coincides with the bioorganic world. Therefore the selection of L-amino acids for the formation of proteins for living matter could have been the result from plasma processes occurring during the impact meteorites on the surface. This indicates that the plasma torch from meteorite impacts could play an important role in the formation of biomolecular homochirality. Thus, meteorite impacts possibly were the initial stage of this process and promoted conditions for the emergence of a living matter.

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