

IMPACTS AND THE EARLY EARTH'S CRUST.

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The concept of the origin of the Earth and of other earth group planets and satellites by accumulation of large (up to asteroid size) solid bodies implies that nearly every particle of the planet have passed processing in an impact. Most of planetary material have passed multiple processing by impacting projectiles. The global result of such processing is not yet well understood. In the present paper we discuss the possible consequences of impact accumulation scenario based on the experimental investigation of simulated impact vaporisation chemistry. The main mechanism of differentiation of silicates during an impact could be a result of the separation of elements between melt and vapour phase. Experiments show that the main path of evolution of condensed matter by impact simulated vaporisation is: ultramafic rocks - mafic rocks - granites - nepheline sienites. Experiments also indicate the enrichment of formed condensates by U, Th, REE. The possible spatial accumulation of condensed material in the upper layers of the planet could be a good source for the formation of the protocrust like structure. The main result of impact processing of the Earth could be its primordial impact-induced differentiation with formation of primordial atmosphere, hydrosphere and protocrust. The formation of the protocrust and its enrichment in volatile components seems was the main factor in the stability of the early atmosphere and of the hydrosphere and as a result was an important factor for the early possibility of life origin.