FORMATION OF HASP AND GASP PARTICLES: EVALUATION OF TEMPERATURE AND MASS LOSS.
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Introduction: HASP (High-Aluminum Silica-Poor) glasses and GASP (Gas-Associated Spheroid Precipitate) condensates [1] are the result of deep impact-induced high-temperature processing of lunar basalts. GASP condensates are divided into Fe-rich FeGASP and Si-rich SiGASP condensates. Our aim was to evaluate temperatures and mass losses which are related to the origin of HASP and GASP particles.

Experiment: We have compared composition of HASP and GASP particles with experimental data of Markova et al. [2] on experimental evaporation of lunar aluminum-rich basalt 68415,40 using effusive Knudsen technique up to ~2600°C with mass-spectrometric analysis of the vapor phase [3] providing also calculations of residua melt and complementary vapor compositions at different temperatures.

Discussion: Experimental compositions of the residua melts and complementary vapor were compared with compositions of HASP glasses and GASP [1] particles. Temperature of HASP formation was evaluated as >1600°C with respective mass loss about one forth to one third of starting mass [1]. Compositional trends of HASP glasses have good coincidence with experimental compositional trend. All HASP glasses correspond to temperatures in the range ~1750-1870°C and mass loss in the range ~20-50%. The dispersion of HASP glasses composition is a result of individual thermal history of each particle.

Condensation from FeO and SiO2 rich vapor was considered [1] to be the most efficient at late stages of cloud expansion when evaporation was terminated by cooling. Condensation of FeGASP particles occurred at temperatures in the range ~1860-1650°C. FeGASPs were formed at lower condensation temperatures. SiGASP particles have compositions beside the experimental data, but on the same trend of enrichment of SiO2 concentration in the vapor up to T~1855°C. We can admit that SiGASP particles were condensed at higher than that for FeGAS tempera-
tures. High concentration of SiO2 can be a result of high tempera-
ture, which is not sufficient for FeO condensation.

Experiment shows that both extreme HASP and GASP compositions can be a result of high-temperature processing of the same basaltic target rock.

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