

Photochemical Model of Impact-Produced Lunar Atmosphere

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The Lunar Prospector mission detected hydrogen-containing compounds in the lunar polar regions. We have considered the cometary hypothesis of the origin of polar volatiles on the Moon. In our previous paper [1] we have found that significant part of the comet material is captured by the lunar gravitation just after the impact. For typical cometary impact the parameters of a such impact-produced atmosphere can be estimated as follows: the concentration of gases near lunar surface is 10^{11} - 10^{13} cm⁻³, the height scale is about 30-100 km. It has been shown that volatile compounds of such artificial atmosphere almost completely delivered into the cold traps if photochemical processes can be discarded [1].

In the present paper we use our model [1] with photochemical processes to be included to estimate chemical composition of volatiles which can be captured by the cold traps.

1. Berezhnoi A.A., Klumov B.A. Lunar ice: Can its origin be determined? Letters to JETP, V.68, P. 163-167, 1998