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1 Glycine and D-alanine in Mars-like Conditions

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A dedicated vacuum system has been designed and is used to characterise the response of organic molecules to the near-surface environment of Mars. Samples of amino acids are produced in a dedicated vacuum chamber (at pressures of $<$ 10-3 mbar) by sublimating the amino acid onto silicon discs ($\sim$1 micron layers). The deposition of the layers is monitored in real-time using a laser interferometer. Before exposure to the Mars-like conditions the state and amount of material on each disc are measured with an IR transmission spectrometer. In current experiments we have subjected the discs to stepwise UV irradiation under hard vacuum ($<$10-5 mbar) and Mars atmospheric conditions. Two gas discharge lamps (hydrogen and deuterium) were used to provide UV light, the H2 lamp being used as a reference lamp. The D2 lamp simulates martian UV between 200 and 250 nm.

Between the steps and after long-term irradiation of the discs, their organic coatings are studied with IR spectroscopy in order to determine the influence of martian environmental parameters onto the destruction of organic material. Using a cold finger to trap gas phase components, the degradation products are studied by means of a mass spectrometer.

We present the final results of the described experiments, in terms of UV destruction cross sections and gaseous degradation products, as well as speculations regarding surface processes on Mars.