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SOME ASPECTS IN THE IRRADIATION OF FROZEN SOLUTIONS OF HCN. A CHEMICAL EVOLUTION OVERVIEW

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The study of extraterrestrial bodies has provided a profound insight on the formation and early history of the solar system. In this regard, many efforts have been put into gathering information on the comets and the chemistry going on in these icy bodies. To this end, the organic inventory of extraterrestrial ices is of central importance concerning the origin of life.

The aim of this work is to study the chemistry involved in the irradiation of frozen solutions of HCN. This compound has been detected in comets and other icy bodies, and the CN group might have made its appearance in the early stages of chemical evolution. Therefore, its behavior under irradiation at low temperature may be relevant for chemical evolution studies.

The efficiency of the radiation-induced synthesis with CN -group suggest that if CN-containing compounds are present in terrestrial or extraterrestrial environments it is very likely that they are condensed into oligomers.

Radiation-induced oligomerization occurs through a free radical mechanism, in very diluted solutions, at least 0.001 M of HCN, in a wide pH range (2-11), with very low radiation doses (2.5 kGy) and in a wide temperature regime, even at 77 K.

After radiation, the inventory of radiolytic products includes: gases, amino acids, carboxylic acids and polymeric material.

It was found that the amounts of measured changes in the products were proportional to the radiation dose given to the system and the molecular masses of the oligomers were independent of the concentration of the target compound.