

RADIATION CHEMICAL RESULTS FROM ICY MOLECULAR SOLIDS – SEARCHING FOR SULFUR.

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The influence of ionizing radiation on low-temperature icy solids has been studied by laboratory scientists for over 40 years, and among the reactions identified are many that are well known to photo- and radiation chemists, and that are of interest to astrobiologists. Such reactions include dissociations, dimerizations, isomerizations, hydrations, hydrolyses, atom transfers, proton transfers (acid-base), and electron transfers (redox chemistry). In keeping with the this session's topics, our presentation will review some of the latest radiation-chemical work from our laboratory, with an emphasis on results that go beyond organic molecules containing just C, H, and O. In particular, we will describe recent experiments that explore reactions of sulfur-containing molecules, both organic and inorganic, which often are ignored due to concerns over cost, smell, toxicity, and damage to equipment. Results involving both acid-base (H^+ transfer) and redox (e^- transfer) chemistry will be presented. The relevance of our work to some current problems in astrobiology and interstellar and solar-system chemistry, and to NASA and ESA missions, will be explored. Some obstacles to progress in the field will be mentioned so as to encourage future investigations.