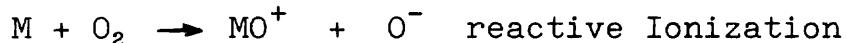
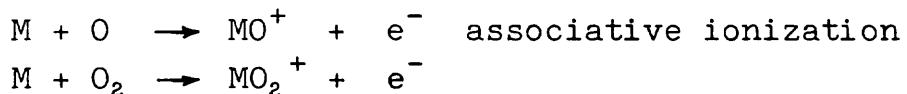


Chemie-Ionization Reactions of Metals with O, O<sub>2</sub>, OH and Halogens in crossed Molecular Beams

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A general program to outline the scope of the gas phase chemi-ionization reactions of metals with reactive gases at low energies, 1,000-3,000 K, has been initiated. The rates, and effective total cross sections, for a number of associative and reactive ionization processes



have been measured. Among the reactions studied have been the associative ionization reactions of the transition metals of groups IIIB, IVB, and VB, Ti, Sc, V; Y, Zr, Nb; La, Hf, Ta; and all 13 stable rare earths from Ce to Lu with atomic oxygen, and the associative and reactive ionization reactions of La and Ce with O<sub>2</sub>. The reactions of the alkaline earths Ba, Sr, Ca with OH, Cl and Cl<sub>2</sub> have also been studied.

The magnitude of the cross sections for these reactions ranges from  $4 \times 10^{-15}$  to  $10^{-23}$  cm<sup>2</sup>. The influence of the threshold energy on the size of the cross section has been investigated, and the consequences of the conservation of angular momentum on the mechanism and product rotational energy distribution has been outlined for exothermic associative ionization reactions.

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