

fusion of butane through the pores was also determined.

#### NOTES

#### Experimental Study of Dissociation of Excited Ions

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The authors ionized ethylene, ethane, *n*-hexane, and toluene by bombardment with 2 KeV electrons and measured the rates of decay of the resulting ions. Most of the excited ions decay in less than  $10^{-9}$ – $10^{-10}$  sec; however, several complex ions decay at lower rates. The authors conclude that the usual mass spectra are not always suitable for determining the mechanism of a complex radiation-chemical reaction.

#### Mechanism of Action of Elemento-Organic Antidetonating Substances

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It is suggested that the antidetonating properties of organic compounds of Pb, Tl, Co, Mn, Fe, Ni, Cu, Bi, Te, and Se are governed by the heat of formation of their oxides ( $Q$ ). If  $Q$  is less than some critical value, then the unbranched  $RO_2$ -annihilating oxidation:  $R\cdot + O_2 \rightarrow RO_2$ ;  $RO_2 + M \rightarrow RO\cdot + MO$ ;  $MO + R\cdot \rightarrow M + RO\cdot$  (where  $M$  is a metal or its lowest oxide) is energetically more favorable than the branched (degenerate) oxidation going via  $RO_2$ . The elements whose organic compounds have antidetonating properties all have values of  $Q \leq 69$  kcal/mole.

#### Radical Formation in Low-Temperature Radiolysis of Benzoyl Peroxide

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The low-temperature radiolysis of benzoyl peroxide was investigated by ESR and mass spectra. The primary gaseous radiolysis product is  $CO_2$  (yield = 6.4 liters/100 eV). The hydrogen yield is 0.15 liter/100 eV. The main primary free radical is the phenyl. It undergoes a secondary reaction, adding to the benzoyl peroxide in a position *para* to the substituent. Radiolysis of one benzoyl peroxide molecule gives two radicals (because of liberation of  $CO_2$ ). Free radical formation in azobenzene proceeds via the same path (because  $N_2$  is liberated in this reaction).

#### Inhibition of Thermal Decomposition of Ammonium Perchlorate by the Products

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The authors studied the decomposition of ammonium perchlorate at 130°–190°C without removing the gaseous products, and measured the resulting pressures. Under these conditions, the decomposition does not go to completion. It stops after a definite gas quantity has been liberated, corresponding to a definite pressure for each temperature (for example, 1600 mm Hg at 150°C). In addition to the usual substances obtained upon decomposition of ammonium perchlorate, the products contain substantial amounts of perchloric acid hydrates. The results are interpreted by assuming that  $NH_4ClO_4$  decomposes via a complex process which includes a reversible dissociation and a self-catalyzing decomposition of the starting salt, in which the products of decomposition of  $HClO_4$  participate. The overall process is inhibited by the accumulation of stable hydrates of perchloric acid.

#### Chemisorption of $H_2$ and $O_2$ on Zinc and Aluminum Oxides in the Presence of Gamma Radiation

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The authors have studied the chemisorption of  $H_2$  and  $O_2$  on  $ZnO$  or  $\alpha-Al_2O_3$  with approximately the same specific surfaces (13–14  $m^2/gm$ ) in the presence of  $\gamma$ -irradiation. The temperature was 20°C. Given the same initial pressures, the rate of chemisorption of oxygen is higher; the oxygen-surface bond is also stronger. The results are interpreted in the light of possible chemical reactions of the chemisorbed gases with the oxides, as well as in the light of possible electronic structures.

#### Oxidation of Propylene over Silver. I. Unpromoted Catalyst

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The authors have studied the oxidation of a propylene-propane mixture over an unpromoted silver catalyst. In addition to propylene oxide, the