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## Phosphorus, Sulfur, and Silicon and the Related Elements

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## Phosphonium and Ammonium Polyborates

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## Phosphonium and Ammonium Polyborates

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Polyborates were prepared by slow hydrolysis of boric acid esters

$B(OR)_3$  ( $R=CH_3$ ,  $i-C_3H_7$ ,  $n-C_4H_9$ ,  $c-C_6H_{11}$ ,  $n-C_8H_{17}$ ) in organic solvents such as acetone in the presence of solutions of quaternary tetraphenylphosphonium or triphenylmethylphosphonium hydroxides. Some amines, some ammonium hydroxides or, for comparison, tetraphenylarsonium hydroxide with a small quantity of water. The basic component must be basic enough and should be bulky; the less bulky bases build pentaborates, the more bulky ones heptaborates, independent of molar ratios, if only the boron concentration is sufficient. The acetone containing pentaborates

$[(C_6H_5)_4P] [B_5O_6(OH)_4] \cdot 0,5 \text{ acetone}$  and

$[(C_6H_5)_3PCH_3] [B_5O_6(OH)_4] \cdot 0,5 \text{ acetone}$  were isolated, in contrary to the solvent free  $[(C_6H_5)_4As] [B_5O_6(OH)_4]$ .

Heptaborates with the anion  $[B_7O_6(OH)_{10}]^-$  are formed with tetra-n-butylammonium and tri-n-butylbenzylammonium cations.