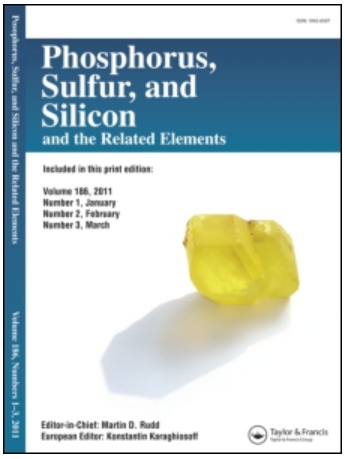

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Chemical Condensation of Phosphoramidates with Acids

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Chemical Condensation of Phosphoramidates with Acids

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Several phosphoramidates and its phenyl ester were reacted with hydrogen chloride, acetic acid, and oxalic acid at room temperature and/or 60 °C.

(1) Reaction with hydrogen chloride

The phosphoramidates and its ester hardly reacted with hydrogen chloride gas, while the presence of water caused decomposition and condensation of the phosphoramidates. The phosphoramidates produced ortho- and polyphosphates by the action of hydrogen chloride and water, and did not give any phosphates with imino groups.

(2) Reaction with acetic acid and oxalic acid

The phosphoramidates reacted with acetic acid and oxalic acid to produce ortho- and polyphosphates, and gave no phosphates with imino groups. The action of acetic acid was stronger than that of oxalic acid. The phenyl ester hardly reacted with acetic acid and oxalic acid even above 60 °C.

Accordingly, the condensation of the phosphoramidates and the phenyl ester with acids to produce imidopolyphosphates by the elimination of ammonia was not observed. Several reasonable reaction mechanisms for these processes will be proposed.