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PREPARATION OF AMMONIUM POLYPHOSPHATE FORM V FROM THE SYSTEM OF DIPHOSPHORUS PENTAOXIDE-AMMONIUM ORTHOPHOSPHATE-UREA

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Many kinds of condensed phosphates are used as chemical fertilizers, food additives, detergents, and soon. Ammonium polyphosphate (APP) is an interesting compound as a flame retardant. APP has six crystal forms of I to VI. Among these six forms, forms I and II are easily produced by heating process, and the other forms are not easy to prepare by heating process.¹ In this study, the preparation of form V APP was examined using the systems of $P_2O_5-NH_4H_2PO_4-CO(NH_2)_2$ and $P_2O_5-(NH_4)_2HPO_4-CO(NH_2)_2$ by heating process. It was found that form V APP was able to prepare by heating a mixture of diphosphorus pentaoxide, ammonium dihydrogenorthophosphate, and urea at 300–350°C under humid ammonia. Determination of crystal form was studied by x-ray diffractometry (XRD). The analysis of the products was made by ^{31}P NMR spectroscopy and scanning electron microscope (SEM). Combustion test of organic polymer material containing form V APP was examined and it was found that form V APP has a high flame resistance when it is mixed in an organic polymer material. The solubility of the APP decreased with increasing reaction temperature.

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