

## Structures and Properties of the Phosphorus-Containing Polyimide Fibers

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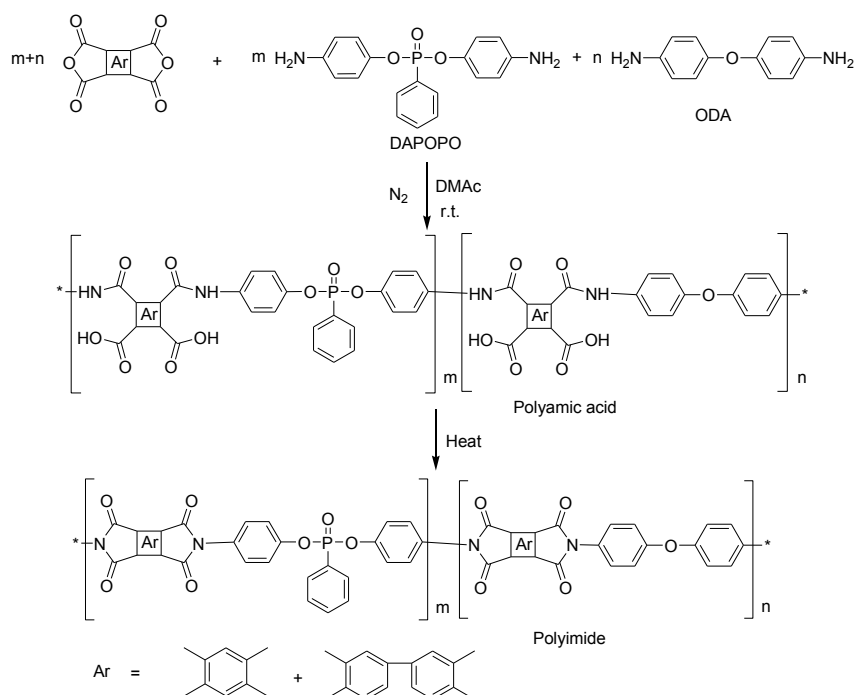
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Aromatic polyimides have been extensively investigated for their excellent thermal stability, high mechanical properties and electrical properties [1–3]. Generally, the preparation of polyimide fibers includes the one-step process and the two-step process. Kaneda [4–5] reported that the polyimide solutions could be prepared in the one-step process in *p*-chlorophenol and the solutions could be directly used for spinning polyimide fibers. In the two-step process, the solutions of the polyamic acids (PAAs) prepared from a dianhydride and diamine in a polar solvent are used for PAAs fibers. The next step is that PAAs fibers are converted to the polyimide by thermal imidization via heating [6–8].

In this paper, new phosphorus-containing polyimide fibers were prepared by dry-jet wet spinning with two-step process (as shown in Figure 1). The mechanical properties of the polyimide fibers remained almost no changes with the increase of the phosphorus contents. The polyimide fibers showed high LOI values in Figure 2, implying their good flame retardant properties. The flame retardant efficiency was raised with the increase of the phosphorus contents.



**Figure 1** Preparation scheme of the polyimide fibers

**Table 1** LOI values of the PI fibers

PI fibers	LOI values
PI1	35
PI2	37
PI3	40
PI4	42
PI5	46

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