

POLYPHOSPHAZENES

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Our research involves the design and synthesis of new polymers that are either fire-resistant or are fire-retardants when incorporated into classical organic polymers. Three approaches are being used. (1) Fire-resistant polyphosphazenes and oligomeric phosphazenes are being chemically-bonded into polyurethanes. (2) Organic polymers with covalently-linked cyclic or linear phosphazenes as side groups have been produced. These are candidates for stand-alone fire-resistant materials or as components in polymer blends and interpenetrating polymer networks (IPN's). (3) New polymers are being prepared in which fire-resistant phosphazene rings are connected together through oligomeric organic linkage groups. These, too, may be utilized either as stand-alone structural or coating materials or as components in blends or IPN's. All these systems have been characterized with respect to molecular and materials properties, and many have been evaluated for fire-resistance. The compatibility of these macromolecules with classical polymers is being evaluated by both theoretical and experimental techniques.