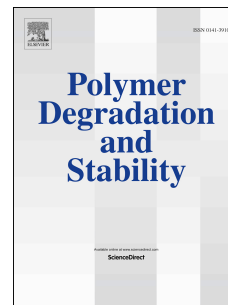


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Linear Polyamidoamines as Novel Biocompatible Phosphorus-Free Surface-Confined Intumescent Flame Retardants for Cotton Fabrics

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Abstract: Eight linear polyamidoamines (PAAs) prepared by polyaddition of amines to bisacrylamides are investigated as intumescent surface-confined flame retardants for cotton textiles. The structure of the amine-derived subunits governs their performances. In ignitability tests, aminoacid-deriving PAAs exposed to direct flame for 10 s do not burn, but produce carbonaceous crusts sheltering the underneath sample apparently intact. PAAs carrying guanidine pendants partially volatilize without burning. 2-Methylpiperazine-derived PAAs burn completely. Thermogravimetric analyses show that in air at ≥ 400 °C all PAAs leave substantial char residues that oxidize at > 500 °C. Horizontal flame spread tests on PAA-impregnated cotton stripes show flame extinction for add-ons ranging from 4 to 20%, apart from 2-methylpiperazine-deriving PAAs

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