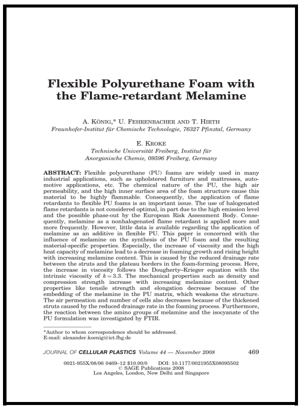
Development of novel flame retardants for polyurethane foams.

University of Salford - PU 119: Design of Efficient Flame Retardants for Flexible and Rigid PUR/PIR Foams



Flexible Polyurethane Foam with the Flame-retardant Melamine

A. KÖNIG,* U. FEHRENBACHER AND T. HIRTH
Fraunhofer-Institut für Chemische Technologie, 76327 Pfinztal, Germany

E. KROKE
Technische Universität Freiberg, Institut für Anorganische Chemie, 09596 Freiberg, Germany

ABSTRACT: Flexible polyurethane (PU) foams are widely used in many industrial applications, such as upholstered furniture and mattresses, automotive applications, etc. The chemical nature of the PU, the high air permeability, and the high inner surface area of the foam structure cause this material to be highly flammable. Consequently, the application of flame retardants to flexible PU foams is an important issue. The use of halogenated flame retardants is not considered optimal, in part due to the high emission level and the possible phase-out by the European Risk Assessment Body. Consequently, melamine as a nonhalogenated flame retardant is applied more and more frequently. However, little data is available regarding the application of melamine as an additive in flexible PU. This paper is concerned with the influence of melamine on the synthesis of the PU foam and the resulting material-specific properties. Especially, the increase of viscosity and the high heat capacity of melamine lead to a decrease in foaming growth and rising height with increasing melamine content. This is caused by the reduced drainage rate between the struts and the plateau borders in the foam-forming process. Here, the increase in viscosity follows the Dougherty–Krieger equation with the intrinsic viscosity of $k = 3.3$. The mechanical properties such as density and compression strength increase with increasing melamine content. Other properties like tensile strength and elongation decrease because of the embedding of the melamine in the PU matrix, which weakens the structure. The air permeation and number of cells also decreases because of the thickened struts caused by the reduced drainage rate in the foaming process. Furthermore, the reaction between the amino groups of melamine and the isocyanate of the PU formulation was investigated by FTIR.

*Author to whom correspondence should be addressed.
E-mail: alexander.koenig@ict.fhg.de

JOURNAL OF CELLULAR PLASTICS Volume 44 — November 2008 469

0021-955X/08/06 0469–12 $10.00/0 DOI: 10.1177/0021955X08095502
© SAGE Publications 2008
Los Angeles, London, New Delhi and Singapore

Description: -
-Development of novel flame retardants for polyurethane foams.
-Development of novel flame retardants for polyurethane foams.
Notes: PhD thesis, Chemistry.
This edition was published in 1994

Tags: #Flame #retardant #property #of #novel #intumescent #flame #retardant #rigid #polyurethane #foams.

Flame retardant flexible polyurethane foams from novel DOPO

Aluminum Hydroxymethylphosphinate and Melamine Pyrophosphate: Synergistic Flame Retardance and Smoke Suppression for Glass Fiber Reinforced Polyamide 6. Highly-efficient reinforcement and flame retardancy of rigid polyurethane foam with phosphorus-containing additive and nitrogen-containing compound. The removal of this product has created a need for a replacement flame retardant in the rigid polyurethane market, especially for pour-in-place panel applications.

Halogen

Direct insertion probe DIP — MS studies indicate that mono DOPO-phosphonamidates volatilize primarily in the first stage of thermal decomposition of PU foams whereas the EDAB-DOPO, being thermally more stable is only detected in gas phase in the second stage.

Novel eco

Meanwhile, with the addition of flame retardant, the combustion mechanism is different. On June 12, 2014, EPA, through its DfE Program, posted for public comment the draft update of a previous alternatives assessment on flame retardants used in flexible polyurethane foam.

Identification of flame retardants in polyurethane foam collected from baby products.

The mechanical properties, thermal degradation and flammability behavior of the obtained RPUFs were evaluated by means of compressive strength tests, thermogravimetry analysis, vertical burning test and scanning electron microscopes. The effects of CMA content on the mechanical, thermal, and flame-retardant properties of FPUF were investigated by tensile test, TGA, limiting oxygen index LOI , flame propagation test Cal T. The SEM and FTIR results indicated that PEPS-RPUF could form a compact and thermostable char residue, which could effectively protect the substrate material from burning.

Identification of flame retardants in polyurethane foam collected from baby products.

The manner in which you use and the purpose to which you put and utilize our advice and information are beyond our control. However, insufficient information is available on the identity of the flame retardants currently in use.

Flame Retardants Used in Flexible Polyurethane Foam

The structure of PNPUQP was confirmed by Fourier transform infrared FTIR spectroscopy and nuclear magnetic resonance NMR. Continuous flame-retardant actions of two phosphate esters with expandable graphite in rigid polyurethane foams. Fire and Materials 2018, 42 4 , 394-402.

Related Books

- Kho va ng Sa m Son - lich-s?u ai-ti nh ti?e u-thuye t
- Study of the Book of Genesis - an introductory commentary on all fifty chapters of Genesis
- Books - from papyrus to paperback
- OECD colloquium to commemorate the 50th annivesary of George Marchalls speech at Harvard University.
- Frontier in American development - essays in honor of Paul Wallace Gates.