

Material Science: Fabric/Textiles

Title: *Nanocomposite Polymers (UMD 05-02)*

Inventors: *Steven B. Warner et al.*

Applications: Improved flame resistant materials

Benefits: Relative to polymer compositions that lack graft polymers, the materials of the invention feature:

- Enhanced flame resistance
- Increased char formation and structural stability
- Increased decomposition temperature

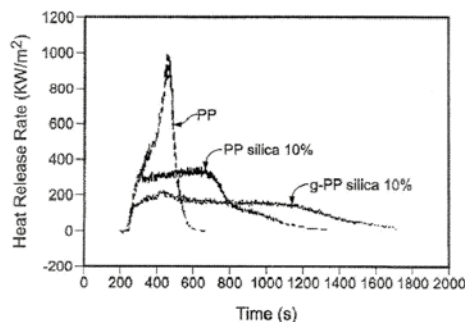
Other benefits of these materials include:

- Decreased heat release rate
- Decreased mass loss rate
- Decreased peak and average smoke production
- Decreased production of carbon dioxide

Technology Description:

The materials of the invention are graft polymers mixed with a nano-sized hydrogen-bonding filler such as silica. The invention features nanocomposite compositions that include a graft polymer and nano-sized silica. The nanocomposite compositions can further include another non-graft polymer. The polymers can include one or more polyolefins (e.g., polypropylenes), polydienes, polyacrylates, polystyrenes, polysiloxanes, polyethers, poly(vinyl aromatics), poly(vinyl halides), epoxies, polycarbonates, silicones, polyesters, synthetic rubbers, polyurethanes, nylons, polyketones, or poly(phenylene oxides). The nano-sized silicas can be fumed silica, colloidal silica, or fused silica.

Patent Status: [US Patent No. 8,143,339.](#)



The figure indicates that the heat release rate for standard untreated polypropylene (PP) is dramatically reduced when nano-sized silica (PP silica 10% and g-PP silica 10%) is

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