

# Applications

## Plasticizers

The use of plasticizers in commercial polymer formulations to decrease  $T_g$  and the internal viscosity, and to increase bulk flexibility is a well-established practice in a multitude of industrial applications. In fact, the “new car smell” enjoyed by many car owners results mainly from the phthalate plasticizer vaporized in the closed car interior, and actually advertises the deterioration of the vinyl upholstery. To improve the permanence of the plasticizer, higher-molecular-weight phthalates are commonly used for modern car interiors. A number of criteria are considered in choosing a plasticizer, including cost, compatibility, stability, ease of processing, and permanence. The degree of permanence and levels of surface migration of phthalate plasticizers, used in plastic toys, have come under fire from various consumer and environmental groups.<sup>1</sup>

In addition to the aforementioned uses, a growing body of research has emerged over the past two decades on the application of plasticized polymers in areas that involve properties not usually associated with polymers. Some of these areas are highlighted below.

- The introduction of **oligomeric poly(ethylene glycols) (PEG)** and derivatives as plasticizers, to effect a significant increase in ionic conductivity as solid polymer electrolytes (SPEs), for use in high energy density batteries and other solid-state electrochemical devices.<sup>2,3,4</sup>
- The use of cellulose triacetate membranes, plasticized with **2-nitrophenyl octyl ether (Aldrich Catalog No. 36,513-0)**, as materials for separations; they are impermeable to metal cations, but allow anion exchange<sup>5</sup> and are also remarkably permeable to neutral, mono- and disaccharides.<sup>6</sup>
- The utilization of **9-ethylcarbazole (ECZ) (Aldrich Catalog No. E1,660-0)** as a plasticizer in guest-host polymers to yield highly efficient photorefractive polymer composites.<sup>7</sup>

Aldrich offers a wide selection of materials in a variety of monomeric and polymeric plasticizer categories including, but not limited to, adipates, azelates, chlorinated hydrocarbons, ethylene glycols, phosphates, phthalates, and sebacates. A sampling of recent additions to the **Aldrich Polymer Products** line is provided below.

<a href="#">46,023-0</a> Bis(2-butoxyethyl) adipate, tech.	100mL; 250mL
<a href="#">46,009-5</a> Bis(2-butoxyethyl) phthalate, tech.	100mL; 250mL
<a href="#">46,010-9</a> Bis(2-butoxyethyl) sebacate, tech.	100mL; 250mL
<a href="#">46,020-6</a> 2-Butoxyethyl oleate, tech.	100mL; 250mL
<a href="#">46,047-8</a> Butyl tallate, tech.	100mL; 250mL
<a href="#">46,021-4</a> Diisodecyl adipate, tech.	100mL; 250mL
<a href="#">46,022-2</a> Diisodecyl glutarate, tech.	100mL; 250mL
<a href="#">46,025-7</a> Diisooctyl dodecanedioate, tech.	100mL; 250mL
<a href="#">46,045-1</a> 2-Hydroxyethyl stearate, tech.	100g; 250g
<a href="#">46,048-6</a> Isooctyl tallate, tech.	100mL; 250mL
<a href="#">46,982-3</a> Poly(ethylene glycol) acrylate, Mn ~375	100mL; 500mL
<a href="#">45,059-6</a> Poly(ethylene glycol) bis(2-ethylhexanoate)	250mL; 1L
<a href="#">45,807-4</a> Poly(ethylene glycol) dibenzoate	500mL; 2L
<a href="#">46,012-5</a> Poly(ethylene glycol) dioleate, Mn ~914	100mL; 250mL
<a href="#">46,016-8</a> Poly(ethylene glycol) monooleate, Mn ~460	100mL; 250mL
<a href="#">45,833-3</a> Sucrose benzoate	500g; 2kg
<a href="#">46,018-4</a> Tri(ethylene glycol) bis(2-ethylhexanoate), tech.	100mL; 250mL
<a href="#">45,805-8</a> 2,2,4-Trimethyl-1,3-pentanediol dibenzoate	1L

If you have questions about these products or about other [monomers, polymers, and additives](#) from Aldrich, please contact our Technical Services Department at **(800) 231-8327** (USA) or e-mail us at [aldrich@sial.com](mailto:aldrich@sial.com).

**References:** (1) *European Chemical News*, July 6, 1998, p 4. (2) Hardy, L.C.; Shriver, D.F. *J. Am. Chem. Soc.* **1985**, *107*, 3823. (3) Chintapalli, S.; Frech, R. *Macromolecules* **1996**, *29*, 3499. (4) Lauter, U. et al. *ibid.* **1997**, *30*, 2092. (5) Hayashita, T. et al. *Chem. Lett.* **1996**, *37*. (6) Riggs, J.A.; Smith, B.D. *J. Am. Chem. Soc.* **1997**, *119*, 2765. (7) Hendrickx, E. et al. *Macromolecules* **1998**, *31*, 734.

