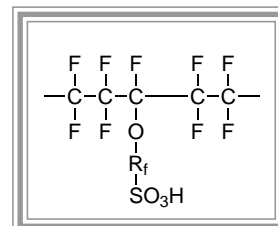


# Applications

## Nafion® Resins: Novel Device Applications

Nafion® resins are perfluorinated ion-exchange materials composed of carbon-fluorine backbone chains and perfluoro side chains containing sulfonic acid groups.

Their application as versatile heterogeneous catalysts in organic transformations has been well established.<sup>1</sup> Also, a patent literature search reveals numerous applications of Nafion® in various electrochemical processes: chlor-alkali membranes, electrode coatings, fuel cells, and more. In more recent years, the potential use of these materials as active or critical components in various devices has been explored. Some novel applications are highlighted here.



### Nafion® in Sensor Technology

- Optically clear blends of poly(vinyl alcohol) and Nafion® (Catalog No. **27,470-4**) applied as thin films to multiple internal reflection and spectroelectrochemical devices as surface modifiers for **chemical sensing**.<sup>2</sup>
- Nafion® catalyst filter modified carbon monoxide **gas sensor** for elimination of ethanol interference without compromising CO detection sensitivity.<sup>3</sup>
- Nafion® membranes for **biosensor** applications evaluated for biocompatibility.<sup>4</sup>

### Nafion® in Solid Polymeric Electrolyte (SPE) Composites

- SPE (Nafion®)–metal composites used as:
  - Artificial muscle actuators.<sup>5</sup>
  - Solid electrolytes in the analysis of electroactive species in organic media.<sup>6</sup>
  - Electrodes in organic electrosynthesis.<sup>7</sup>
- Nafion® based solid polymer fuel cells for pulse power delivery.<sup>8</sup>

Aldrich offers a wide selection of Nafion® resins in various forms allowing you to select the one appropriate for your application. If you have questions or comments about these products or other [Monomers, Polymers, and Additives](#) from Aldrich, please contact our **Technical Services Department** at (800) 231-8327 (US) or your local office, or via e-mail at [aldrich@sial.com](mailto:aldrich@sial.com).

#### Membranes

<a href="#">27,467-4</a>	Nafion® 117, membrane, 0.007in. thick, 8x10in. ....	1ea
<a href="#">29,256-7</a>	Nafion® 117, membrane, 0.007in. thick, 12x12in. ....	1ea
<a href="#">45,473-7</a>	Nafion® 350, membrane, reinforced with Teflon®, 0.01in. thick, 8x10in. ....	1ea
<a href="#">39,334-7</a>	Nafion® NE 450, membrane, reinforced with Teflon®, 0.017 in thick, 12x12in. ....	1ea
<a href="#">27,468-2</a>	Nafion® 417, membrane, reinforced with Teflon® and Dacron®, 0.017in. thick, 4x5in. ....	1ea

#### Beads/Granules

<a href="#">30,938-9</a>	Nafion® NR50, beads, 7-9 mesh .....	10g; 25g
<a href="#">47,454-1</a>	Nafion® SAC-13, granules, 8-50 mesh .....	10g; 25g
<a href="#">39,292-8</a>	Nafion®, trimethylsilylated. ....	10g; 25g

#### Solutions

<a href="#">27,470-4</a>	Nafion® perfluorinated ion-exchange resin, 5 wt. % solution in a mixture of lower aliphatic alcohols and water (20%) .....	25mL; 100mL
<a href="#">51,021-1</a>	Nafion® perfluorinated ion-exchange resin, 5 wt. % solution in a mixture of lower aliphatic alcohols and water (45%) .....	25mL; 100mL

Nafion, Teflon, and Dacron are registered trademarks of E.I. du Pont de Nemours & Co.

**References:** (1) See [Aldrich Technical Bulletin AL-163](#) and references therein. (2) Gao, L.; Seliskar, C.J. *Chem. Mater.* **1998**, *10*, 2481. (3) Kitsukawa, S. et al. *Chem. Sens.* **1997**, *13* (Suppl. A, Proc. 24<sup>th</sup> Chemical Sensor Symp., 1997), 49. (4) Turner, R.F.B.; Sherwood, C.S. *ACS Symp. Ser.* **1994**, *556* (Diagnostic Biosensor Polymers), 211. (5) Mojarrad, M.; Shahinpoor, M. *Proc. SPIE-Int. Soc. Opt. Eng.* **1997**, *3040* (Smart Materials Technologies), 294. (6) Jiang, J.-H. et al. *Electroanalysis* **1998**, *10*, 343. (7) Jiang, J.-H. et al. *J. Electroanal. Chem.* **1997**, *420*, 31. (8) Lakeman, J. et al. *J. Power Sources* **1997**, *65*, 179.