

Alkaline-developable Positive-type Photosensitive Polyimide based on Poly(amic acid) containing card structure and Fluorinated Diazonaphthoquinone

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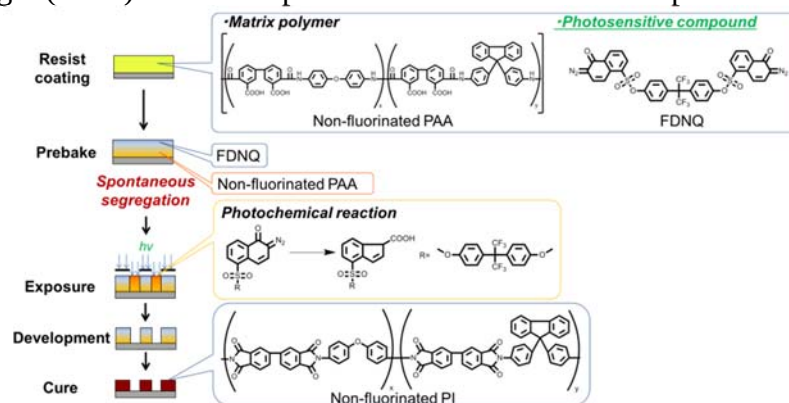
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ABSTRACT

Recently, positive-type photosensitive polyimides (**PSPIs**) as a stress buffer and insulation layers have been receiving much attention. However, development of positive-type **PSPIs** is a limited success because the dissolution rate of poly(amic acid)s (**PAAs**) in a 2.38 wt% aqueous tetramethylammonium hydroxide (TMAHq) solution is too high to obtain a sufficient dissolution contrast between unexposed and exposed areas due to the high acidity of the carboxylic acids in **PAAs**. In a previous paper,¹ we reported an alkaline-developable positive-type **PSPI** based on fluorinated poly(amic acid) (**FPAA**), **PAA**, and fluorinated diazonaphthoquinone (**FDNQ**) as a photoactive compound. The cast film spontaneously formed the two phase-separated layers by prebaking, a thin top layer of **FPAA** containing **FDNQ** and a thick bottom layer of **PAA**, where fluorinated monomers were used to reduce the dissolution rate of **PAA** to the TMAHq solution. A cardo monomer with high hydrophobicity would be suitable as the alternative to fluorinated monomers. Here, we report an alkaline-developable positive-type **PSPI** based on non-fluorinated **PAA** prepared from 3,3',4,4'- biphenyl-tetracarboxylic dianhydride, 4,4'-oxydianiline, and 4,4'-(9-fluorenylidene) dianiline, and **FDNQ**. The new **PSPI** showed an excellent sensitivity and a high contrast when it was exposed to 365 nm wavelength light (*i*-line) and developed with a 2.38 wt% TMAHq solution.



References:

1. Y. Inoue, Y. Saito, T. Higashihara and M. Ueda, *J. Mater. Chem.* 2013, 1, 2553-2560