

Abstract

NOVOLAK/ DNQ BASED, CHEMICALLY AMPLIFIED PHOTORESIST

The present invention relates to resist compositions comprising a polymer component, a photoacid generator component (PAG), a photoactive diazonaphthoquinone component (PAC), a base component, a solvent component, and optionally, a heterocyclic thiol component. The polymer component is a Novolak derivative, comprising Novolak repeat units with free phenolic hydroxy moieties, and Novolak repeat units comprising phenolic hydroxy moieties protected with an acid cleavable acetal moiety. The acetal moiety is selected from a monofunctional alkyl acetal moiety protecting a repeat unit comprising a Novolak phenolic hydroxy moiety, an acetal, comprising a moiety functionalized with a PAC moiety, protecting a repeat unit comprising a Novolak phenolic hydroxy moiety; a di-functional acetal comprising moiety, linking and protecting two repeat units comprising Novolak phenolic hydroxy moieties, forming a linking point in said polymer component between two different polymer chains in said polymer component, and a mixture of any of these three types of acid cleavable acetal moieties. The PAC component is selected from said acetal, comprising a moiety functionalized with a PAC moiety, protecting a repeat unit comprising a Novolak phenolic hydroxy moiety, a free PAC component, and a mixture of these two types of PAC components. The present invention also relates to the methods of using the present compositions in either in thick or thin film photoresist device manufacturing methodologies.

(FIG. 4)