UNDERLAYER COATING COMPOSITION AND ~~PROCESS~~ PROCESSES THEREOF

The present invention relates to an absorbing underlayer coating composition comprising a polymer, where the polymer comprises at least one aminoplast group and in the backbone of the polymer at least a substituted or unsubstituted hydroxyaromatic with pendant fluoro or iodo moiety. The invention also relates to a process for forming an image using the absorbing underlayer composition. The process is especially useful for imaging photoresists using radiation in the deep ultraviolet, 100-260 nm (DUV) and extreme ultraviolet, 13.5 nm (EUV) region.

Photoresist compositions are used in microlithography processes for making miniaturized electronic components such as in the fabrication of computer chips and integrated circuits. Generally, in these processes, a thin coating of film of a photoresist composition is first applied to a substrate material, such as silicon based wafers used for making integrated circuits. The coated substrate is then baked to evaporate any solvent in the photoresist composition. The baked coated surface of the substrate is next subjected to an image-wise exposure to radiation.

This radiation exposure causes a chemical transformation in the exposed areas of the coated surface. Ultraviolet (UV) light, electron beam and X-ray radiant energy are radiation types commonly used today in microlithographic processes. After this image-wise exposure, the coated substrate is treated with a developer solution to dissolve and remove either the radiation-exposed or the unexposed areas of the photoresist.

The trend towards the miniaturization of semiconductor devices has led to the use of new photoresists that are sensitive to lower and lower wavelengths of radiation and has also led to the use of sophisticated multilevel systems to overcome difficulties associated with such miniaturization.