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(54) **TWO-STEP PHOTORESIST COMPOSITIONS AND METHODS**

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See application file for complete search history.

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(57) **ABSTRACT**

The present disclosure relates to novel two-step photoresist compositions and processes. The processes involve removing acid-labile groups in step one and crosslinking the remaining material with themselves or added crosslinking systems in step two. The incorporation of a multistep pathway in the resist catalytic chain increases the chemical gradient in areas receiving a low dose of irradiation, effectively acting as a built in dose depend quencher-analog and thus enhancing chemical gradient and thus resolution. The photoresist compositions and the methods are ideal for fine pattern processing using, for example, ultraviolet radiation, beyond extreme ultraviolet radiation, extreme ultraviolet radiation, X-rays and charged particle rays. Dual functionality photosensitive compositions and methods are also disclosed.

14 Claims, 5 Drawing Sheets