Novel Resist Pattern Transfer Process for 70nm Technology Node Using 157-nm Lithography

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Novel resist pattern transfer process for 70nm technology node is presented using 157-nm lithography. By using newly developed 157-nm resists and a 157-nm microstepper (NA=0.60), sub-100nm resist patterns are fabricated. Three types of structures are presented for the pattern transfer process. Two of these are hard mask (HM) processes, and the other is a bi-layer process using Si-containing resist. For all these structures, the underlayers of resist work well as anti-reflecting layers. By optimizing the RIE gas conditions, resist pattern is successfully transferred to the underlayer. Using the HM as an etching mask, sub-100nm gate pattern is fabricated. The fabrication of sub-70nm gate pattern is currently under study using 0.85-NA microstepper.