

METHOD FOR FORMING RE-ENTRANT PHOTORESIST LIFT-OFF
PROFILE FOR THIN FILM DEVICE PROCESSING AND A THIN
FILM DEVICE MADE THEREBY
ABSTRACT OF THE DISCLOSURE

A method for forming a re-entrant photoresist lift-off profile for thin film device processing of particular utility in conjunction with self-aligned sputtered films, such as permanent magnet ("PM")
5 films, for use in magnetoresistive ("MR") read heads as well as a device made thereby. Photoresist is patterned in a conventional manner upon the thin film layers overlying a suitable substrate and the photoresist is then exposed to a suitable developer
10 resulting in photoresist regions having substantially vertical sidewalls. An electron beam, or other suitable energy source, is then utilized to cross-link (or render relatively insoluble) the upper portion of the positive tone resist image by accelerating a
15 sufficient dose of electrons into the photoresist to a well controlled depth. A second electron beam is then distributed throughout the entire photoresist thickness to render the lower portion of it relatively more soluble in a developer. The resist is then
20 developed for a predetermined time to achieve an undercut in the lower portion of the photoresist.

FIGURE 3A-C