Bit patterned media (BPM) are often fabricated by a nano patterning process, followed by filling process and planarization process. BPM needs these additional steps (filling and planarization process) to overcome the flying instability of the head-slider on topographically patterned surfaces having valleys and trenches. These extra steps can result in significantly increased cost and complexity of processing with implications on structural reproducibility and reliability issues.

We have developed patterned media via ion implantation using a convenient nano polymer mask approach and Au nano mask approach for local control of coercivity of magnetically hard \([\text{Co/Pd}]_n\) multilayer film with a \([\text{Co 0.3nm/Pd 0.8nm}]_8/\text{Pd 3nm/Ta 3nm}\) layer structure. The \([\text{Co/Pd}]_n\) multilayer film with vertical magnetic anisotropy is sputter deposited and the regions corresponding to the magnetic recording bit islands are coated/masked with polymer islands using nano-imprinting technique and Au islands using di-block copolymer technique. Subsequent ion implantation (with nitrogen, chromium, oxygen) allows patterned penetration of implanted ions into unmasked portion of the \([\text{Co/Pd}]_n\) multilayer film, thus creating magnetically isolated bit island geometry while maintaining the overall flat configuration of the patterned media. A significant coercivity reduction, as evaluated by VSM measurement, was accomplished in the areas outside the periodically aligned magnetic islands. Various process parameters and their implications for bit patterned media applications will be discussed.