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Industrial applications of plasma immersion ion implantation

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Abstract

Plasma Immersion Ion Implantation (PIII) is a fledgling surface treatment technique which can also be used to fabricate novel materials. Applications include the fabrication of silicon-on-insulator (SOI) for the microelectronics industry and surface enhancement of aerospace and industrial components. When combined with wafer bonding, the ion-cut / PIII technique can be used to produce SOI much more economically than conventional methods. Other industrial applications include the modification of oil pumps used by Daqing Oil Company in China. PIII is being used to implant the interior surfaces which are difficult to access by conventional implantation techniques. The capability of PIII to treat irregular-shaped specimens also makes it an excellent method to treat the races of satellite ball bearings, artificial teeth, and artificial hearts. The PIII program at the City University of Hong Kong has attracted funding from companies in the Silicon Valley in California and Japan. It was awarded the "excellent" rating by both RGC and CityU in 1999. The Plasma Laboratory research members have published about 150 papers since the establishment of the laboratory in 1996 and filed over 10 US patents.