Corrosion Resistive Laser Marking of Stainless Steel by Atlantic Series Picosecond Laser

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Medical tools and other devices made of stainless steel (SS) require laser markings for unique device identification (UDI). These markings need to be corrosion resistant in order to withstand numerous autoclave cycles. EKSPLA with FTMC has developed a picosecond laser marking system – for reliable UDI marks on surgical and spring grade of stainless steel for corrosion resistive applications.

Experimental results on the effect of the laser processing parameters on colour of the marking and resistance of laser modified surface to corrosion in this application note are presented. The study was conducted on the surgical (316) and spring (7C27Mo2) grades of SS by using commercially available industrial Atlantic series laser from EKSPLA. The colour modifications of the SS were induced by using picosecond laser irradiation. The colour of the marking was modified by scanning the laser beam focused on the surface of the SS samples (Fig. 1).

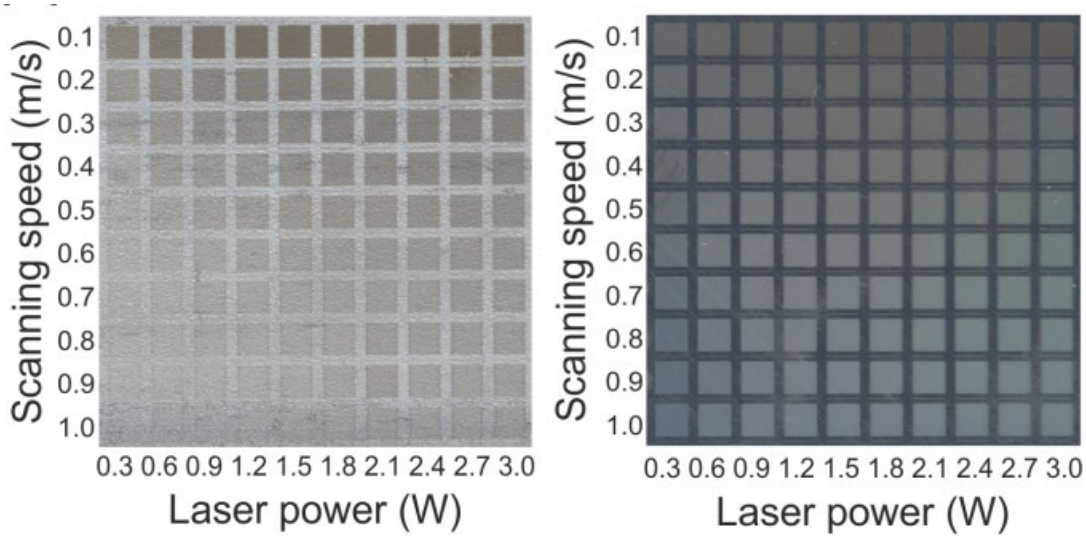

Fig. 1. Surgical (left) and spring (right) grades of stainless steel marked by picosecond Atlantic series laser.

The scanning speed and mean laser power were varied in order to enhance the visually perceived brightness of the marked areas. It was determined experimentally how various process parameters, such as the laser power, and scanning speed affected the marking colour obtained (Fig. 2).

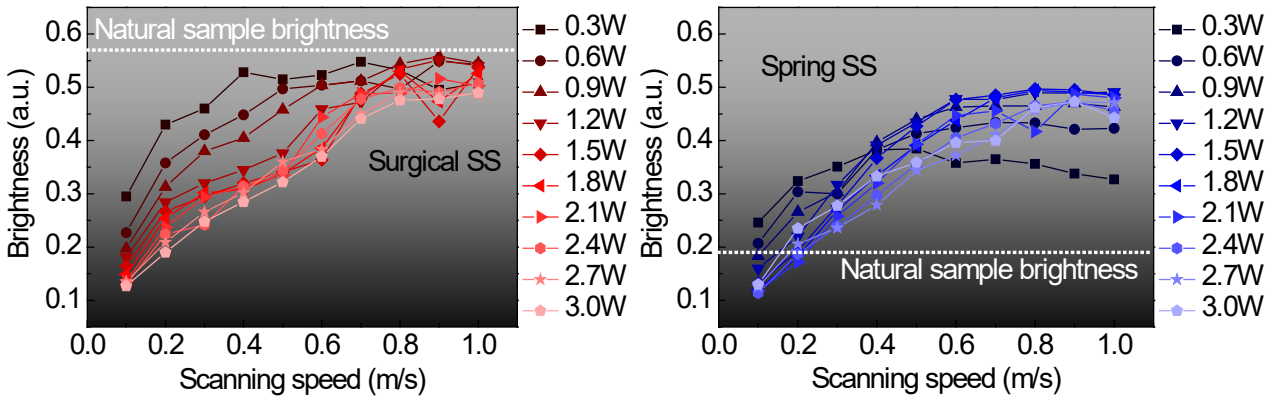

Fig. 2. The visually perceived brightness of surgical (left) and spring (right) grades of stainless steel marked by picosecond Atlantic series laser.

The colour of stainless steel was lightened and darkened controlling laser power or scanning speed of the beam. The resistance of the laser marked areas to the corrosion was tested by using the salt spray test according to the international standard (ISO 9227). The marking can withstand extreme environmental conditions and are absolutely rust-proof.