

CO₂ laser surface treatment and covering with carbon black on AISI 4340 steel

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This work presents the results of the CO₂ laser beam irradiation of steel samples surfaces (AISI 4340) previously coated with a carbon black solution, made of ethyl alcohol plus carboxymethylcellulose. The carbon black acts as an absorber material to the incident radiation and transfer part of the energy absorbed to the metallic surface samples that quickly dissipates to the metal volume. This laser treatment process, called laser hardening, promoted surfaces changes and it was characterized by the evaluation of the micro hardness of the irradiated zone. The hardness zone was increased at about three times. It was observed by X-ray diffraction, that part of the carbon black used as an absorber layer, remains on the surface and by tests of pin on disc, the friction coefficient was reduced from 0.7 to 0.2.

Keywords: CO₂ laser, carbon black, surface hardening, AISI 4340 steel.

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