

Effects of thermal treatment with CO₂ laser on the structure and the hardness of compressed aluminum samples

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Abstract : In this research, samples of aluminum was prepared using the compression and annealing methods. Continuous CO₂ laser and thermal heating in suitable oven were used for annealing procedures. FT-IR spectroscopy was used for prepared samples description. Mechanical hardness properties were measured using hardness tester.

Results conclude that the surface layer is oxidized in different levels depending on both, the method and the time of treatment. Two different phases of aluminum oxide were noticed which are Amorphous (non-crystalline) and Gamma phases. Moreover the important structural changes were observed when using time intervals bigger than 10s. Annealing using thermal oven did not provide quick structural changes like when the laser was used, but it led to higher mechanical hardness and less structural defects.

Key Words: Aluminum, Compressed, Annealing, CO₂Laser.

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