THE EFFECT OF CO_2 LASER POWER ON THE THERMAL INSULATION OF ACRYLICS

Nafie A. Almuslet[1*], Mohammadi Hassan M. Beteik[2] & Gaafar Abdelhamid[2]

[1]* Institute of laser – Sudan University of Science and Technology (www.sustech.edu), Khartoum / **REPUBLIC OF SUDAN**, P. O. Box (407), mnmfa2008@yahoo.com or: nafiealmoslot@sustech.edu
[2]College of Engineering - Sudan University of Science and Technology, beteik.mohammadi@gmail.com

ABSTRACT

In this work, the effect of the power of CO_2 laser on the thermal insulation of acrylic sheets was studied. Five different colors of PMMA sheets with 100 x 100 x 2mm were irradiated by CO_2 laser to engrave micro-channels resemble blackbody cavities; namely red, green, blue, black and white sheets (RGBKW). The laser power was 30, 25, 20 and 15 Watts. The micromachining was done in the x-y platform controlled electro-pneumatically. Experimental results showed a temperature reduction between micro-machined and standard samples (without irradiation) of PMMA, using different laser powers. The thermal insulation was changed with increasing the laser power, which fulfilled the state of increased thermal insulation of acrylic sheets when laser micro-machined, and consequently fulfill the purpose of this work.

Keywords: Laser Micromachining; PMMA; Thermal Insulation; x-y; Laser in material processing.