

Laser texturing to increase the hydrophobicity of marble

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Conservation strategies to limit the degradation of stone due to the access of water are being constantly developed. In this sense, new products and procedures have been recently designed to enhance the hydrophobicity of stone (Camaiti et al., 2017; Frigione et al., 2018). However, some of these products can present serious drawbacks, such as human health and environmental risks in addition with colour modifications and reduction of vapor permeability above the threshold which is recognized as high risk for interventions in cultural heritage. Laser texturing of a surface consists in making geometrical structures through ablation processes, in order to change the surface relief on a micro-metric or even nano-metric scale to meet a specific functional requirement, such as modification of the wettability of the rock surface (Chantada et al., 2017).

In this work, preliminary results of laser texturing of a marble from the Iberian Peninsula are presented. Surface treatments were performed using ultra-short pulse laser and the objective was to find the optimal processing parameters to increase the hydrophobicity of the surface. In this sense, different patterns consisting of matrices of points or line arrays were tested.

Characterization of the treated surfaces was performed by means of stereomicroscopy, scanning electron microscopy and measurement of both roughness and colour parameters. The hydrophobicity of the processed marble was assessed by contact angle measurements.

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