

The subject of this diploma thesis was the preparation of hydrophobic thin films on marble's surface, in order to protect it from rain droplets and air pollutants, in general. These films were created by a spraying process, which is cheap, easy to handle and independent of the substrate used. The above reasons make this method easy to use in large-scale applications for the protection of the heritage monuments. We performed several experiments for the measurement of water's contact angle on the thin film's surface, after it was deposited on the substrate. Colorimetric measurements demonstrated that the substrate's color does not change after the thin film is deposited. We also performed peeling tests, which resulted in very good values for the mechanical stability of the thin film. The morphology of the films was examined using scanning electron microscopy (SEM). The experimental measurements have shown that due to the formation of double-scale roughness (micro- and nano-) all substrates became hydrophobic, sometimes reaching superhydrophobicity. Furthermore, a theoretical study for the correlation between the tilt angle and the adhesion force was performed, since surfaces with high water contact angle (140°) did not have a low tilt angle.