

Marble hydrophobicity tuned by Si-based coatings

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Hydrophobic polymers applied on stone materials increase their durability against undesired weathering processes [1]. The achievement of a certain degree of surface hydrophobicity (reducing the water permeation) constitutes one of the main research focuses [2]. Herein, two commercial Si-based resins (*e.g.* Alpha[®]SI30 and Bluesil[®]BP9710), directly applied on Carrara marble substrates and a silanization process, by using trichloromethylsilane (TCMS), were adopted. Contact angle measurements were carried out to evaluate the hydrophobic features. Hence, since only in the case of TCMS a good hydrophobicity was achieved (θ around 150°), two commercial polysiloxane-based additives (*e.g.* TegoPhobe 1500N and TegoPhobe 1650) were added respectively to Alpha[®]SI30 and Bluesil[®]BP9710, according to their chemical compatibility. These auxiliary substances allowed to decrease the wettability features of marble. Furthermore, since all the investigated coatings could be used as stone materials protective agents, water capillary absorption and vapor permeability tests were performed. Also, in this case, TCMS revealed to be the most performing one among the adopted silane-based resins, thanks to the drastic reduction of absorbed water and the decrease of vapor permeability within the threshold value of 50%. Finally, the coatings stability was evaluated by accelerated ageing tests.

References

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