



HUMIDITY SORPTION ON NATURAL BUILDING STONE

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processes, physical, chemical or biological, depend on the presence of water. Like most porous materials building stone respond on humidity by water uptake. The sorption isotherm represents the equilibrium moisture, specific for each material.

The determination of the isotherm for stone of low and small porosity like marble is difficult. With the help of a newly developed water sorption analysis chamber [2], which allows the simultaneous measurement of 11 samples, good results on stone/rock samples have been obtained. Even at marble species with pore volumes lower than 0.4 % isotherms are measured. This analytical method offers new insights in the pore behaviour of low porosity materials. The advantages of this technique which supplements other techniques (e.g. BET, Hg-porosimetry) are: i) the testing agent is identical to the weathering agent, water; ii) the atmospheric parameters at the measurement reflect the natural conditions - thus no changes to the material properties have to be considered; iii) due to the small diameter of the water molecule (0.28 nm), smaller pores are reached than e.g. with N₂ (0.31 nm).

Sorption isotherms of sandstone (Baumberg, Obernkirchen, Groeden), granite (Brixen), and marble (Sterzing, Laas) are presented. Particular as to marbles the resolution is considerably higher. A previously observed negative hysteresis [3] seems an effect due to limited data resolution.

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