

Prediction method of water absorption of soft rock considering the influence of composition, porosity, and solute quantitatively

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Abstract: The study of water absorption of soft rock is of great significance to the prevention engineering disasters. However, the research on the prediction method of water absorption of soft rock considering the influence of composition, porosity, and solute is insufficient. Aiming at the above problem, the water absorption tests are carried out by synthesizing soft rocks and water solutions. Then, the prediction model of water absorption of soft rock is established through quantitative analysis of water absorption data, and compared with the water absorption characteristics of natural rock to verify the reliability of the model. The results show that the changes of water content and water absorption velocity of soft rock with time obey the second-order exponential attenuation function and the linear function (double logarithmic coordinates axis) respectively. The types of cation and anion and the type and content of clay minerals have the greatest influence on the process of rock water absorption. In addition, the water absorption prediction model could better predict the water absorption process of natural rock. The research results solve the problem of insufficient research on soft rock water absorption prediction method considering the influence of composition, porosity and solute.

Keywords: soft rock water absorption; composition; porosity; solute; prediction method