

Experimental analysis of the ratio of similar materials by similarity model test on raw coal

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Similarity model test is an effective approach to study the mechanism of hydraulic fracture propagation in coalbed methane reservoirs as well as theoretical analysis and numerical simulation. The efficiency of similarity model test result is closely related to the selection and ratio of similar materials. Similar material ratio test was conducted to simulate the mechanical parameters of raw coal by using orthogonal method and an appropriate similarity model for hydraulic fracturing experiment was developed in the paper. Results show that it is suitable to select cement, gypsum as binder and apply pulverized coal as aggregate through the analysis of experimental data. The mechanical parameters of similar materials, including uniaxial compressive strength, elastic modulus, Poisson's ratio and firmness coefficient, are tested by laboratory tests. The impact of diverse ratios of similar materials on the mechanical parameters is analyzed. A proper ratio is selected to make the mechanical parameters of raw coal and similar material close, which is able to meet the demand of similarity model test based on raw coal. The results can provide theoretical basis and technical support for the selection of similar materials to carry out hydraulic fracturing experiment.

Keywords: raw coal, hydraulic fracturing, similar material, mechanical parameter, experimental investigation.

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