

The influence of pore size distributions on gas permeability of over-mature shale

Q. T. WANG^{1*}, T. L. WANG², H. LU³

¹ NO. 511, Kehua Street, Tianhe District, Guangzhou City, China (*correspondence: wangqingtao@gig.ac.cn)

² NO. 511, Kehua Street, Tianhe District, Guangzhou City, China (wangtaoli@gig.ac.cn)

³ NO. 511, Kehua Street, Tianhe District, Guangzhou City, China (luhong@gig.ac.cn)

Gas permeability is widely used in predicting shale gas production. Thus, the investigations of controls on gas permeability are very necessary. Chalmers et al.(2012) stated that a balanced ratio between micro-pores, meso-pores and macro-pores is helpful for the flow capacity of shale reservoir. However, we do not know what a balanced ratio is and how the pore size distributions (PSD) affects gas permeability of over mature shale.

The vertical permeability of over mature Wufeng-Longmaxi shale under an effective stress of 3.45Mpa ranged from 0.9 μ d(micro darcy) to 2.9 μ d. The contribution of meso-pores (2nm<pore width <50nm) to the total pore volume is defined as Con_{mes} . The situation is similar for macro-pores (pore width >50nm). According to the results, gas permeability was positively correlated with the contribution of meso-pores to the total pore volume (Con_{mes}) and negatively related with the contribution of macro-pores to the total pore volume (Con_{mes}). This might be attributed to the better connectivity of meso-pores than that of macro-pores.

