1 Introduction

The coal bearing basin in the east of Northeast China is many, and the little or middle fault depression of low or middle rank coal bearing basin is the main, including Jixi, Boli, Shuangyashan, Hegang, Hulin and other basins (TANG Shuheng, 2000). Several coal bearing basins have seen well show of CBM(Table1). But the research of the coal bed gas system is not carried out at present. The main controlling factor of the coal bed gas accumulation in the middle and small fault subsidence is unclear. This directly affects the further exploration and development of CBM.

2 Main Control Factors for Reservoir Formation

2.1 Generation capacity analysis

From generation analysis, Jixi Basin coal rank is between 0.7% to 1.7% and coal seam gas isotope mainly distributed between 39% to 41%. According to the discriminant mklov (2010) origin of natural gas in the chart, Jixi Basin Chengzihe Coal Seam Gas in thermogenic gas mainly (Su xianbo, 2007). The higher the coal rank, thicker, angry amount is larger.

The thickness and coal rank is the key factors affect the gas production rate.

2.2 Reservoir capacity analysis

From the reservoir analyzes, coal bed methane gas is adsorbed mainly unconventional gas, and therefore the adsorption capacity is a key factor affecting of the reservoir capacity.

Coal seam adsorption capacity is inherent in nature. The adsorption ability of the coal seam is inherent in the coal seam itself. Adsorption experiments and measured from Jixi Basin Coal industry and isothermal gas content analysis of experimental data correlation analysis showed that factors affecting the adsorption capacity of Jixi Coal Basin have seams, ingredient and coal rank three key factors.

From the coal seam fixed carbon composition and gas content analysis, the coal seam fixed carbon content in Jixi basin is generally between 56% ~ 64%. The fixed carbon content is positively related to the adsorption capacity.

According to the relationship between the coal bed ash and gas content, the ash content of the coal bed is less than 10%. The ash content is negatively correlated with the adsorption capacity.

From the microscopic and adsorption capacity analysis, the content of the mirror in the Jixi basin is generally between 52% ~ 85%. The mirror mass is positively correlated with the adsorption capacity, and is the main contributor of the adsorption capacity.

From the coal rank and isothermal adsorption experiments, the coal seam adsorption ability of the Jixi basin is positively correlated with the coal rank. With the increase of coal rank, the adsorption capacity of the coal seam increases.

So the content of the mirror and the coal rank are the key factors to the reservoir.

2.3 Preservation conditions analysis

From the analysis of the preservation, roof and floor lithology of coalbed methane is the most direct seal. Good capping layer can reduce the coal layer gas loss of the tectonic movement process, coal seam roof and floor is one of the key factor to affect the preservation conditions (Meng Zhaoping, 2010).

From the top and bottom lithology statistics of the Jixi Basin coalbed methane and the relationship with gas content, coal seam roof and floor lithology is mainly siltstone, mudstone, fine-grained sediments and coarse sandstone and sandstone content is less. Mudstone roof
and floor sealing is better than siltstone roof and floor. Sandstone porosity and permeability analysis indicates that the sandstone porosity is generally 2.6% to 15%, with an average of 5.4% and permeability is generally 0.11 ~ 0.72mD, an average of 0.32mD. From the porosity and permeability, the sandstone in Jixi basin belongs to the low porosity and the low permeability. Tight sandstone can also be used as a capping layer of gas adsorption in coal seam. Multiple fault number and phases have caused complicated tectonic framework of Jixi basin.

The number of faults in the Jixi basin is much more than that of the period, resulting in the complexity of the structural pattern. There are more than 300 proven faults in exploration. Compressive fault, extension fault, twisting fault are development. According to its distribution directions, there is SN direction, EW direction, NNE direction, NE direction, and so on. Most of the fault in the basin is normal. In general, generally, near the extensional faults cross-section is low pressure area due to the tectonic stress release and a low pressure area is not conducive to CBM reservoir preservation.

So the structural stability is the key factor for the preservation of the coal bed gas in the Jixi basin.

2.4 Permeability analysis

The permeability is the key factor for the successful development of CBM (Qin Yong, 2012). Through the observation of coal reservoir core in Jixi basin, the coal structural is integrity. Primary structure and fragmentation structure are the main structures. From statistical analysis, the coal rock generally reaches 12 ~ 20 per 10cm. Coal rock cleat is developing in Jixi basin. The SEM analysis shows that the coal reservoir is dense and the pore is not development (Fig 1). The pores are mostly solitary secondary pores and are nano-grade. So it is suggested that the permeability of coal reservoir is controlled by the development of cleat (TANG Shuheng, 2004; SU Xianbo, 2004).

Through the analysis of the control factors of cleat, the cleat is controlled by the internal and external two factors. The internal factor is the content of the ash and the content of the mirror. The ash is lower, the content of the mirror is higher, and the development of cleat is.

The external factor is structural position. The stress release zone is the site of cleat development (LIU Mei, 2000). The stress release location of slope is the advantageous part of cleat development.

3 Conclusions

In summary, it is in the coal rank coal basin in the north-eastern region, construct a stable and high rank coal bed methane thick seam area is favourable areas. The slope and other stress release area in the favourable zone are the favourable block for CBM reservoir formation.

References


Fig. 1. The main coal seam scanning electron microscope photos in Jixi Basin