

Basic Characteristics of Hydrocarbon Source Rocks of Marine Carbonate Rocks

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Abstract: Effectiveness to the aspect of enrichment of oil and gas in deep basin of Bohai Bay basin is in the east of China is rich in oil and gas resources of large rift basin, the oil and gas resources has great potential and extensive distribution of high-quality marine hydrocarbon source rocks are marine strata in the material foundation, but specific to the meso Proterozoic effective hydrocarbon source rock distribution and hydrocarbon source rock distribution and hydrocarbon generation potential, oil and gas resources evaluation also need to be further identified, in urgent need of existing data and data base, to strengthen the layer system of research and understanding and evaluation of hydrocarbon source rocks and resource potential, to promote the Bohai Bay Basin, the deep oil and gas exploration and exploration decision-making provide important basis.

Keywords: Bohai Bay Basin, Carbonate rocks, Hydrocarbon source rock.

NORTH OF MIDDLE UPPER PROTEROZOIC CHARACTERISTICS

Formation characteristics

North China is the global marine strata are the most developed one of the regions, in the Middle Upper Proterozoic period is a continental sea, the main formation with marine carbonate rocks. In Upper Proterozoic Archean metamorphic basement in deposited giant thick formation of Middle Upper Proterozoic Paleozoic marine carbonate rocks of the clip clastic rock formation, thickness of 6000~14000m. In the Upper Proterozoic mostly epicontinental sea sediments, lateral lithology is relatively stable, vertical form a complete sedimentary cycle. In the Upper Proterozoic were divided into three departments twelve layer group, respectively, the Department of the Great Wall, Jixian County and Qingbaikou system [1].

Distribution characteristics of hydrocarbon source rocks

Foreign marine carbonate hydrocarbon source rock mainly developed in the Mesozoic and Cenozoic strata, in space is all over in many regions, such as the Devonian in western Canada, the United States South Florida basin of Lower Cretaceous system [2]. Compared with foreign countries, China's marine carbonate rocks of the era of the old, hydrocarbon source rocks in Paleozoic especially lower Paleozoic, age is old, marine strata undergo a long and complicated thermal effect, to make organic matter in marine carbonate rocks mostly in high mature and over mature stage, and no immature hydrocarbon source rock [3].

DOMESTIC AND FOREIGN RESEARCH STATUS OF MARINE CARBONATE SOURCE ROCKS

People of carbonate rocks as the hydrocarbon source rock of understanding later than argillaceous rocks, our carbonate compared with foreign countries, are older ages, low abundance of organic matter, high degree of thermal evolution, buried depth and other features, difficult to study far greater than the foreign, nearly 20 years, some scholars in our country of carbonate source rocks were a lot of fruitful work, especially in recent years, Liangdigang, Xiaxyu, etc, through the study of marine carbonate rocks in China, the formation of carbonate source rocks in China relatively independent research system.

STANDARD FOR EVALUATION OF HYDROCARBON SOURCE ROCKS IN MARINE CARBONATE ROCKS

Lower organic matter abundance

Organic carbon content is one of the basic indicators used to measure the organic matter abundance of hydrocarbon source rocks, but there are obvious differences and arguments between the lower limit values of organic carbon in marine oil source rocks. The lower limit values were proposed by scholars both at home and abroad. So far, the marine carbonate hydrocarbon source rock organic matter limit value is still not a unified standard, overall and the lower limit of the change trend of high, also in the correct evaluation of source rock organic matter abundance and hydrocarbon generation potential, especially evaluation of high over mature carbonate rocks, the general response to the original organic

matter abundance and hydrocarbon generation potential of recovery.

Type of organic matter

The type of organic matter not only affects the hydrocarbon generating capacity of the source rocks, but also determines the nature of the hydrocarbon generation. Generally speaking, reductive sedimentary environment of kerogen types for type I and type II, this kind of carbonate rock is mainly basin facies, Guanghai shelf facies, deep water facies deep - deep water depositional products, and in oxidation conditions of sedimentary carbonate rocks, the original organic matter type of May is better, but due to the influence of oxidation, the types of organic matter will by variability and kerogen type III mainly. The carbonate rocks appear and open platform, restricted platform, evaporation platform, reef and beach shallow water pole in shallow water sedimentary environment.

At present, determining the type of organic matter mainly bitumen "a", organic carbon isotope composition, whole rock light sheet, kerogen elemental composition, microscopic identification, infrared spectrum, organic maceral, hold powder, pyrolysis analysis etc.

Organic matter maturity

Marine carbonate rocks in China is high over mature features and thick strata lack of terrigenous vitrinite, coupled with mature oil and gas to determine the degree and oil / gas source rock correlation exist more uncertainty and conventional organic geochemical evolution index does not apply. Scholars at home and abroad by comparison analysis, has established alternative indicators including bitumen reflectance, mirror like reflectance, animal organic detritus reflectivity, kerogen average aromatic nuclear structure size, tooth shape thorn discoloration index etc., [4-9].

CHARACTERISTICS OF HYDROCARBON SOURCE ROCKS OF MARINE CARBONATE ROCKS

Distribution characteristics of high over mature marine hydrocarbon source rocks

High over mature marine hydrocarbon source rocks in the age distribution is mainly controlled by the marine transgression and the periodic change of marine transgression and regression in source rocks in geological history process according to the times, the temporal regularity of distribution. Widely distributed in China's high over mature marine carbonate source rocks, which are distributed in North China, South China, Ordos Basin and Tarim Basin. Times are different hydrocarbon source rock distribution range are different, which not only with their deposition of ancient climate, ancient geographical environment and diagenesis about and its rock of various geological

processes, the organic thermal evolution has a close relation.

Organic geochemical characteristics

The type of organic matter and hydrocarbon generating materials

Marine hydrocarbon source rock kerogen to bacteria and algae, organic matter in marine carbonate rock belongs to partial sapropel type, kerogen types I and II type 1, II type 1 kerogen. Organic matter in marine carbonate source rocks is aggregation and dispersion state of existence, of which dispersed organic matter points into three types: one is adsorbed organic matter, mainly adsorption on the surface of rocks and minerals, is free of asphalt, but the peritectic organic matter, mainly wrapped aphanitic or fine crystalline mineral, is the migration of primary organic matter; the third is inclusion organic matter, mainly produced in the crystalline minerals in the inclusions, with a certain form, which belongs to the migration of the secondary organic matter.

Organic matter abundance

The content of organic carbon in marine carbonate source rocks in China is generally low, generally between 0.1%~1.0%. Under different deposition conditions, the content of organic matter has obvious difference. Although calcite and dolomite adsorption ability of organic matter less than clay minerals and carbonate rock in diagenesis of organic matter crystallization and excluded from the part of the organic matter, but marine carbonate rocks of the organic matter in the basic source in algae algae and fungi, body is rich in protein and fat, and therefore can not be based on present organic carbon content and underestimate the his effective hydrocarbon generation potential.

Thermal evolution

Our country marine carbonate strata in Paleozoic, especially lower Paleozoic, age is old, marine strata undergo a long and complicated thermal effect, resulting in marine carbonate organic matter mostly in high mature and over mature stage, and no immature hydrocarbon source rocks [3].

Hydrocarbon generating model

Many domestic and foreign researches show that the segmented models for hydrocarbon generation and evolution of marine carbonate rocks with, is the first stage for the pyrolysis of biopolymer poly, immature oil; the second stage for the thermal degradation of kerogen, with mature oil; the third stage is encapsulated organic matter and bound the release of organic matter can still be to provide a certain amount of liquid petroleum. Some scholars put forward four stage into hydrocarbon, namely original asphalt depolymerization into hydrocarbons, organic package released hydrocarbon and pyrolysis gas generating hydrocarbon, kerogen degradation [10]. Marine carbonate

hydrocarbon generation model emphasizes the early hydrocarbon generation and high maturity of organic matter released or cracking of hydrocarbon generation of importance, and that the carbonate hydrocarbon areas, especially the source range wide on the muddy hydrocarbon source rocks, the hydrocarbon generation peak is obviously lagging behind Yu Haixiang argillaceous hydrocarbon source rocks.

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