

Oil-Gas Shows from Destruction Hydrocarbon Reservoirs in the Petroliferous Basins of China and their Geological Significance

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Abstract

Oil-gas shows can provide much important information to explore the related residual or secondary reservoirs in oil-bearing basins. Based on field survey, geological analysis, and literature investigation, the geological setting and the distribution characteristics of the oil-gas shows in China, had been used to systematically classify the oil-gas shows types, to discuss their genetic mechanisms, and to analyze their petroleum geological significance. According to the degree of destruction of reservoirs, oil-gas shows of China can be classified into three types: partial destruction, strong destruction, and complete destruction. The partial-destruction type, such as oil/gas seepage and mud volcano, is mainly distributed in the western and southern China. It can be further divided into four kinds according to their ways of out-flowing: surface-cutting fault, uplifting-denudation, diapir penetrating, and unconformity outcropping. The strong-destruction type, such as heavy oil, is mainly distributed in the western and eastern China. The complete-destruction type, such as natural bitumen, tar sand and mineral wax, mainly occurs in the western and southern China. Because of different destruction mechanism of reservoirs, different types of oil-gas shows had different genetic mechanism. The partial-destruction type of oil-gas shows evolved from reservoirs with only one-time destruction, and their formation and distribution are controlled by intense tectonic movements, frequent earthquakes and rapid deposition. The strong destruction and complete destruction evolved from reservoirs with secondary-destruction, and their formation and distribution are controlled by the water washing, oxidation and biodegradation after destroyed directly. In the early stage of petroleum exploration, the partial-destruction oil-gas shows, principally that on thrust belt and diaper structure, have greater guiding significance to discover underground reservoirs. Although all kinds of destructive effects can destroy reservoirs into oil-gas shows, they could also have positive influences on the hydrocarbon redistribution and preservation. Therefore, preservation condition is the key factor to find reservoirs in areas with oil-gas shows.