The formation of shallow biogas of Songliao Basin, China

X. LUO, Y. ZHANG AND J.LI

Research Institute of Petroleum Exploration & Development, Beijing 100083, China (Luoxia69@petrochina.com.cn, Zhangy69@petrochina.com.cn, lijian69@petrochina.com.cn)

Gases appearing with different grade in over 10, 000 wells in Changyuan structure of Daqing show that shallow biogases widespread distribute in Songliao Basin. Biogases mainly distribute from several dozen meters to 1600 meters and from Nengjiang formation to Qingshankou formation of Cretaceous vertically and mainly distribute the medium and the west of basin. Gases are mainly biogases such as Aonan, Alaxin and Honggang gas pools. The contents of methane and ethane in biogas pools are between 92% and 94% and between 0% and 0.3 respectively. The contents of nitrogen and dioxide are between 3% and 15% and 0.5% and 1.7% respectively. The ratio of total hydrocarbon divided by methane is more than 0.99. The isotope compositions of methane and ethane are between -51.9‰ and -55.9‰ and between -42.7‰ and -37.3‰.

The research indicates that there has good geological environment of forming biogas in shallow layer of Songliao Basin. Firstly, during the period from Qingshankou formation to Nengjiang formation of Cretaceous, the sedimentary environment had being anaerobism. Thousands of types of organism in palaolake with area up to 200, 000 km^2 are suitable for Methanobacteria living. Secondly, most of these rocks are immature with vitrinite reflectance are lower than 0.5% now. The temperature is relative low. Methanobacteria likes to live in here. Thirdly, relatively low contents of sulphate and salinity (mainly from 2000 to 3000ppm) are suitable for Methanobacteria living. Fourthly, there are kinds of bacteria determined in present rocks. Methanobacteria have detected from 25 rock samples in 33 rock samples. Better organic type of rocks, Methanobacteria is more easily to be detected. Fifthly, rocks from Qingshankou formation to Nengjiang formation of Cretaceous are easily to be degraded by anaerobic bacteria. The degree of degradation of rock is related with type of organic matter and living environment of bacteria. The better of type, the more easily to be degrade, while, it is no connection with formation and vitrinite reflectance of rocks.

Comparison study on the extraction ability of heavy metals availability in contaminated soils by different extraction techniques

X.M. LUO, D.D.LIU AND F. LIU*

Beijing Key Laboratory of Water Resources & Environmental Engineering, China University of Geosciences(Beijing), Beijing, 100083, PRC (*correspondence: feiliu@cugb.edu.cn)

The environmental risks of heavy metals depend on its speciation distribution in contaminated soils. The chemical speciation analysis was one of the hot topics in environmental sciences. In this paper, four soil samples with different pH values were collected. The Tessier, BCR and TCLP extraction techniques were employed to extract heavy metals available fraction.

Samples	Extraction techniques	Extraction ratio (%)				
		As	Cu	Ni	Pb	Zn
S1 pH=3.61	Tessier	18.90	78.71	91.79	88.54	91.32
	BCR	15.32	76.77	90.52	76.69	90.61
	TCLP	12.56	75.02	90.11	67.19	90.14
S2 pH=4.16	Tessier	0.46	78.63	85.72	80.33	89.37
	BCR	0.39	73.63	82.24	58.43	86.19
	TCLP	0.44	70.39	80.85	48.90	83.32
S3 pH=5.91	Tessier	35.56	73.17	62.41	81.40	61.37
	BCR	26.96	33.94	35.74	28.96	49.73
	TCLP	23.24	32.00	30.339	20.18	46.20
S4 pH=7.01	Tessier	17.19	47.04	43.70	53.39	51.33
	BCR	14.56	23.04	40.22	10.51	39.07
	TCLP	13.57	19.18	39.58	8.42	37.27

Table 1: Availability fraction extraction ratios by three extraction techniques.

The results illustrated the Availability fraction extraction ratios by three extraction techniques. In order to extract heavy metals available fraction in soils correctly, different sequential extraction procedures should be employed for soils with different properties.

[1] Tessier, Campbell & Bisson (1979) Sequential extraction procedure for the speciation of particulate trace metals [J]. *Analytical Chemistry* **51**(7), 844–851.