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摘要:

徐家围子断陷深层首次发现以腐泥型气为主的有机成因天然气, 不同地区深层天然气成因类型及各种成因气贡献定量测试方法并进行了实验验证, 采用天然气甲烷碳同位素、乙烷碳同位素和甲基环己烷指数、环己烷指标, 确定了腐殖型气、腐泥型气、有机深源气的5个成因类型指标端元值, 利用天然气的混合配比性建立成因类型数学模拟方法建立计算模板, 首次定量测试了徐家围子断陷深层天然气样品中3种有机成因气的定量贡献。实天然气除昌德气藏芳深1井、芳深2井有机深源气贡献为81%外, 其他井的腐殖型气、腐泥型气和有机深源气平均2.02%; 不同地区及井段的腐殖型气、腐泥型气和有机深源气贡献有差别, 升平—汪家屯地区平均贡献分别为61.74%、14.48%、11.77%, 兴城—徐东地区及断陷中东部平均贡献分别为51.98%、40.99%、7.平—汪家屯、昌德到兴城—徐东地区有机深源气贡献减少、腐泥型气贡献增大, 部分井段腐泥型气贡献超过43%气贡献最大达74%, 与断陷中东部烃源岩II型有机质相对发育及断陷地层地质特征相吻合, 呈现主要来源于下伏主、侧向运移为辅的源岩控制成藏特征。

关键词: [腐殖型气](#) [腐泥型气](#) [有机深源气](#) [无机成因烷烃气](#) [数学模拟计算](#)

Deep Gases and Their Genetic Types of the Xujiaweizi Fault Depression Zone, Songliao Contribution [Download Fulltext](#)

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Abstract:

Sapropel dominated gas was first found in the Xujiaweizi fault depression zone (XFDZ), Songliao Basin. This paper focuses on various deep gases in different areas and their genesis. 35 deep gas samples from 29 wells and 26 samples from 26 wells north of the Songliao Basin were collected for analysis of stable carbon isotopes and hydrocarbon fingerprint chromatogram. The experiment suggests that deep gas contains humic gas, organogenic gas, with little or minor abiogenetic alkane gas. Quantitative measurement methods to organogenic gas are proposed for the first time in this study and has been verified through experiments. Indexes including methane carbon isotope, ethane carbon isotope, methylcyclohexane index, cyclohexane hydrocarbon parameter are used to identify 5 end indexes of humic gas, sapropel type gas and organogenic gas. Geochemical modeling for genetic type indexes using natural gas blend matching and calculation theoretical mathematical simulation method initially measures the contributions of the three organogenic gas types. Results show that besides the contribution of organogenic gas accounting for 81%, which comes from Fangshen 2 well in the Changde gas reservoir, the average contributions of humic gas, sapropel type gas and organogenic gas are 62.45%, 25.51% and 12.02%, respectively. Humic gas, sapropel type gas and organogenic gas contribute distinctively in different regions or intervals. The average contribution of the three gas types in the Shengping-Wangjiatun region is 61.63%, 20.94% and 17.29%, respectively; that in the Changde and Deyang regions is 11.77%; that in the Xingcheng-Xudong and central eastern areas of the fault zone is 51.98%, 40.99% and 7.02% to Wangjiatun, and from Dechang to the Xingcheng-Xudong region, the contribution of organogenic gas increases while that of sapropel type gas increases, with the contribution of organogenic gas increasing from 40% to 79%. All these features coincide with the type II organic development in the middle of the fault depression zone, and geologic features of the fault depression zone. This vertical migration of gas from the underlying source rock, with lateral migration as secondary contribution to the reservoir.

Keywords: [humic gas](#) [sapropel type gas](#) [organogenic gas](#) [abiogenetic alkane gas](#) [mathematical simulation](#)