

### 重油中类型氧含量的分布

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#### Distribution of the Functional Oxygen Content in Heavy Oils

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**摘要** 采用电位滴定法分别测定了克拉玛依原油、委内瑞拉原油和抚顺减压渣油中6类含氧官能团的类型氧含量,对克拉玛依原油及委内瑞拉原油的正庚烷沥青质和可溶质分别进行了FT-IR分析,并对委内瑞拉原油正庚烷沥青质进行了XPS分析。结果表明,不同重油中各类型氧含量基本具有共同的分布规律,即主要为醛、酮羰基类氧,酯基类氧以及羧基类氧,石油加工过程对重油中类型氧含量分布具有影响;原油中存在>C=O、—COOH、—COO—、—OH等含氧官能团,克拉玛依原油中醛、酮羰基类氧含量最多,委内瑞拉原油中酯基特征吸收峰明显,与电位滴定法定量结果一致;委内瑞拉原油正庚烷沥青质表面含有大量的C—O键。

**关键词:** 重油; 类型氧; 分布; IR XPS

**Abstract:** Contents of six functional oxygens in KLMY, WNRL and FSVR were determined by potentiometric titration method. The heptane asphaltene and heptane soluble fractions of KLMY and WNRL were investigated by FT-IR, respectively, and the heptane asphaltene of WNRL was characterized by XPS. The results indicated that there was a common distribution rule of functional oxygen content in different heavy oils. The most existing functional oxygens were aldehyde and ketone carbonyl oxygen, ester oxygen and carboxyl oxygen. Petroleum refining process had an influence on the distribution of the functional oxygen content in heavy oil. The >C=O, —COOH, —COO— and —OH functional groups were in oil, and the content of aldehyde and ketone carbonyl oxygen was the most in KLMY and the characteristic absorption peak of ester group was obviously in WNRL. All of these results were consistent with the distribution result of the functional oxygen content determined by potentiometric titration method. There was a good deal of C—O on the surface of WNRL heptane asphaltene.

**Keywords:** heavy oil, functional oxygen, distribution, IR, XPS

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