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メタンハイドレートにおけるラジカル反応生成物

Products by radical reactions in methane hydrate

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Clathrate hydrate is a crystal compound of water molecules encaging gust molecules. Natural gas hydrate is found under deep ocean see and in permafrost regions, and expected to be a future natural gas resource. Estimation of formation age in natural gas hydrate has been attempted using the ^{129}I method (e.g. Fehn et al., 2003), which is an indirect age determination method. In contrast, we have investigated to establish a direct age determination method from hydrate crystal itself. Since natural gas hydrate is formed in sediment and irradiated by natural radiation due to natural radioisotopes like ^{40}K, U-series and Th-series, chemical reaction via radicals may occur in natural samples. In methane hydrate, methyl radicals are induced by gamma-rays (Takeya et al., 2004). However, they are unstable at the natural condition of temperature and pressure, and dimerize to ethane (Ishikawa et al., 2007). In another reaction, methanol is also formed after gamma-ray irradiation to methane hydrate (Tani et al., 2008). In this study, we have investigated whether the other chemical products will be formed by gamma-irradiation in methane hydrate using GC-MS.

キーワード:メタンハイドレート,自然放射線,ラジカル,メタノール,ガスクロマトグラフ,年代測定

Keywords: methane hydrate, natural radiation, radical, methanol, gas chromatograph, dating