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## 期刊文章



## Catalytic thermal reactions of cumene over sepiolite and palygorskite

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## Abstract in English | in German

The catalytic activity of sepiolite and palygorskite in cracking and disproportionation reactions of cumene was studied. The formation of benzene, diisopropylbenzene and propylene characterizes Brönsted acid sites whereas that of ethylbenzene characterizes Lewis acid sites. At 150 and 250° C the reactions are determined mainly by the presence of acid sites in the channels of these clays. The yields are significantly higher in sepiolite as compared to palygorskite. The concentration of acid sites and their strength increase with the thermal loss of zeolitic and part of the bound water. At 350° C the reactions are determined by the acidity of the external surface of both minerals and yields are only slightly higher in sepiolite. At 150° C most acid sites are of the Brönsted type. With the rise in temperature the relative concentration of Lewis acid sites increases.

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Dedicated to Prof. Dr. H. J. Seifert on the occasion of his 60<sup>th</sup> birthday

## CATALYTIC THERMAL REACTIONS OF CUMENE OVER SEPIOLITE AND PALYGORSKITE

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The catalytic activity of sepiolite and palygorskite in cracking and disproportionation reactions of cumene was studied. The formation of benzene, diisopropylbenzene and propylene characterizes Brønsted acid sites whereas that of ethylbenzene characterizes Lewis acid sites. At 150 and 250°C the reactions are determined mainly by the presence of acid sites in the channels of these clays. The yields are significantly higher in sepiolite as compared to palygorskite. The concentration of acid sites and their strength increase with the thermal loss of zeolitic and part of the bound water. At 350°C the reactions are determined by the acidity of the external surface of both minerals and yields are only slightly higher in sepiolite. At 150°C most acid sites are of the Brønsted type. With the rise in temperature the relative concentration of Lewis acid sites increases.

Clay minerals are used as catalysts in many cracking and disproportionation processes [1, 2]. The catalytic activity, which is mainly determined by the surface acidity of the mineral, results from the presence of surface groups, such as siloxane, silanol, aluminol, -Al-O and -Mg-O, located at the edges of the alumino- and magnesium-silicate frameworks, as well as from exchangeable cations and adsorbed water molecules. Most studies on the catalytic activity of clays, were dealing with swelling smectite minerals and only very little work was carried out with sepiolite and palygorskite [3-18]. These minerals are built of TOT ribbons with a width along the *b*-axis of three linked tetrahedral chains in sepiolite and two linked chains in palygorskite. The two minerals are characterized by having parallel zeolitic channels into which small molecules can penetrate [19-22]. It has been recently shown by electron microscopy that due to defects some of the chan-

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