

新型层柱微孔材料-XW11Co柱撑Zn-Al型层柱化合物的合成、表征及催化活性研究

胡长文,刘彦勇,王作屏,王恩波

东北师范大学化学系

收稿日期 修回日期 网络版发布日期 接受日期

摘要 采用水热合成与离子交换方法,将中心原子不同的过渡金属( $\text{Co}^{2+}$ )

取代型Keggin结构杂多阴离子 $\text{XW}_{11}\text{O}_{39}\text{Co}(\text{H}_2\text{O})^n^-$  ( $\text{X}=\text{Ge}^{4+}$ ,  $\text{B}^{3+}$ 和 $\text{Co}^{2+}$ )嵌入Zn-Al型阴离子粘土层间,

合成了底面间距( $d_{001}$ )为 $1.46\pm 0.01\text{nm}$ 的新型层柱化合物 $\text{Zn}_2\text{Al-GeW}_{11}\text{Co}$ ,  $\text{Zn}_2\text{Al-BW}_{11}\text{Co}$ 和 $\text{Zn}_2\text{Al-CoW}_{11}\text{Co}$ ;

通过XRD, IR, XPS和DTA等手段,研究了它们的结构与性质,推测了这些杂多阴离子( $\text{XW}_{11}\text{Co}$ )

在层间的空间取向;考察了这些新型层柱化合物对乙酸与n-丁醇酯化反应的催化活性;

吡啶吸附IR光谱研究表明,它们同时具有B酸与L酸两种酸中心。

关键词 [红外分光光度法](#) [杂多酸](#) [X射线衍射分析](#) [丁醇](#) [X射线光电子谱法](#) [乙酸](#) [差热分析](#) [催化活性](#)  
[酯化反应](#) [KEGGIN结构](#)

分类号 [0643](#)

## Synthesis, characterization and catalysis of a new type of microporous material-XW11Co-pillared Zn-Al type layered double hydroxides

HU CHANGWEN,LIU YANYONG,WANG ZUOPING,WANG ENBO

**Abstract** The heteropolyoxometalate,  $\text{XW}_{11}\text{O}_{39}\text{Co}(\text{H}_2\text{O})^n^-$  ( $\text{X}=\text{Ge}^{4+}$ ,  $\text{B}^{3+}$ , and  $\text{Co}^{2+}$ ) having Keggin structure is intercalated into the interlayer space of Zn-Al type layered double hydroxide via both hydrothermal reaction and ion exchange reaction, and a new type of pillared layered microporous compounds,  $\text{Zn}_2\text{Al-GeW}_{11}\text{Co}$ ,  $\text{Zn}_2\text{Al-BW}_{11}\text{Co}$  and  $\text{Zn}_2\text{Al-CoW}_{11}\text{Co}$  with higher basal space ( $d_{001}=1.46\pm 0.01\text{nm}$ ) have been obtained. The structure and properties of the new compounds were studied by XRD, IR spectra, XPS and DTA. The orientation of the intercalated anions  $\text{XW}_{11}\text{Co}$  was deduced. Catalytic activity of those new compounds for esterification of acetic acid with n-butanol was also studied. It was found that the catalytic activity is higher than HY. Their IR spectra of pyridine adsorption indicated the new compounds possess both B-acid centre and L-acid centre.

**Key words** [INFRARED SPECTROPHOTOMETRY](#) [HETEROPOLYACID](#) [X-RAY DIFFRACTION ANALYSIS](#) [BUTANOL](#) [X-RAY PHOTOELECTRON SPECTROMETRY](#) [ACETIC ACID](#) [DIFFERENTIAL THERMAL ANALYSIS](#) [CATALYTIC ACTIVITY](#) [REACTION KINETICS FOR THE ESTERIFICATION](#)

DOI:

通讯作者

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(380KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“红外分光光度法” 的相关文章](#)

▶ [本文作者相关文章](#)

- [胡长文](#)
- [刘彦勇](#)
- [王作屏](#)
- [王恩波](#)