



有机-无机杂化磷酸锆及胺插层化合物的MAS NMR 研究

MAS NMR Study on Zirconium Phosphonate-phosphates and Their Amine-intercalated Compounds

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中文摘要:

英文摘要:

The layered zirconium [N-(phosphonomethyl)iminodiacetic acid-phosphate] $Zr(HPO_4)_{1.34}[O_3PCH_2N(CH_2CO_2H)_2]_{0.66} \cdot H_2O$ can only be prepared in the series of the zirconium phosphonate-phosphates $Zr(HPO_4)_{2-x}[O_3PCH_2N(CH_2CO_2H)_2]_x \cdot H_2O$ (ZPPMI DA) by the reaction of zirconium oxychloride with phosphonic acid and $H_2O_3PCH_2N(CH_2CO_2H)_2$ in the designed x range of $0 < x < 2$, which had been monitored by using the phosphorus integration value ratio of HPO_4^{2-} and $[O_3PCH_2N(CH_2CO_2H)_2]^{2-}$ group in the ^{31}P MAS NMR spectra. After intercalation of *n*-butyl amine, the ^{31}P chemical shift of HPO_4^{2-} group at -8.0~-10.0 ppm moved to 6.0 ppm with a change of 14.0-16.0 ppm and that of $[O_3PCH_2N(CH_2CO_2H)_2]^{2-}$ group at -29.1 ppm changed only 0.5 ppm. Due to the pillared effect of $[O_3PCH_2N(CH_2CO_2H)_2]^{2-}$ groups on the interlayer spacing, intercalated amines such as *n*-butylamine, *n*-hexyl amine and *n*-octyl amine easily reacted with HPO_4^{2-} group in ZPPMI DA ($x=0.66$) rather than that in α -ZrP, and carboxylic group ($-CO_2H$) in ZPPMI DA ($x=0.66$).

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