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Full Paper

咪唑配位的夹心型锑钨多氧酸盐$Na_9[\{Na(H_2O)_2\}_3\{M(C_3H_4N_2)\}_3(SbW_9O_{33})_2]\cdot xH_2O$ (M= NiII, CoII, ZnII, MnII)

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摘要 在pH≈7.5的水溶液中，$Na_2WO_4\cdot 2H_2O$,$SbCl_3\cdot 6H_2O$, 咪唑与 $NiCl_2\cdot 6H_2O$ (或$MnSO_4\cdot H_2O$,$Co(NO_3)_2\cdot 6H_2O$, $ZnSO_4\cdot 7H2O$)反应得到了四种咪唑配位的夹心型锑钨多氧酸盐$Na_9[\{Na(H_2O)_2\}_3\{M(C_3H_4N_2)\}_3(SbW_9O_{33})_2]\cdot xH_2O$ (M=NiII, x = 32, CoII, x = 32,ZnII, x = 33, MnII, x = 34)。用X射线单晶衍射法确定了$Na_9[\{Na(H_2O)_2\}_3\{Ni(C_3H_4N_2)\}_3(SbW_9O_{33})_2]\cdot 32H_2O$的结构,聚阴离子$\{Na(H_2O)_2\}_3\{Ni(C_3H_4N_2)\}_3(SbW_9O_{33})_2]_9$-具有近似$C_{3v}$对称性，3个咪唑环垂直于中心带上六个金属离子(Na-Ni-Na-Ni-Na-Ni)
所形成的平面。晶体结构中相邻的阴离子间存在着π-π相互作用，相邻咪唑的二面角为60°。用IR, UV-vis, TG和DSC,对这些化合物的性质进行了表征，推测了它们的热分解过程。

关键词 杂多化合物, 晶体结构, 咪唑, 过渡金属
分类号

Imidazole Coordinated Sandwich-type Antimony Poly- oxotungstates $Na_9[\{Na(H_2O)_2\}_3\{M(C_3H_4N_2)\}_3(SbW_9O_{33})_2]\cdot xH_2$

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Abstract The imidazole covalently coordinated sandwich-type heteropolytungstates $Na_9[\{Na(H_2O)_2\}_3\{M(C_3H_4N_2)\}_3(SbW_9O_{33})_2]\cdot xH_2O$ ($M=Ni^{II}$, $x=32$; $M=Co^{II}$, $x=32$; $M=Zn^{II}$, $x=33$; $M=Mn^{II}$, $x=34$) were obtained by the reaction of $Na_2WO_4\cdot 2H_2O$, $SbCl_3\cdot 6H_2O$, $NiCl_2\cdot 6H_2O$ [$MnSO_4\cdot H_2O$, $Co(NO_3)_2\cdot 6H_2O$, $ZnSO_4\cdot 7H_2O$] and imidazole at pH≈7.5. The structure of $Na_9[\{Na(H_2O)_2\}_3\{Ni(C_3H_4N_2)\}_3(SbW_9O_{33})_2]\cdot 32H_2O$ was determined by single crystal X-ray diffraction. Polyanion $[\{Na(H_2O)_2\}_3\{Ni(C_3H_4N_2)\}_3(SbW_9O_{33})_2\}_3]^{9-}$ has approximate C_{3v} symmetry, imid- azole coordinated six-nuclear cluster $[\{Na(H_2O)_2\}_3\{Ni(C_3H_4N_2)\}_3]^{9+}$ is encapsulated between two $(\alpha\text{-}SbW_9O_{33})^{9-}$, the three rings of imidazole in the polyanion are perpendicular to the horizontal plane formed by six metals (Na-Ni-Na-Ni-Na-Ni) in the central belt, and π-stacking interactions exist between imidazoles of neighboring polyanions with dihedral angel of 60°. The compounds were also characterized by IR, UV-Vis spectra, TG and DSC, and the thermal decomposition mechanism of the four compounds was suggested by TG curves.

Key words polyoxometalate crystal structure imidazole transition metal

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