



## HY沸石超笼“半三明治”环戊二烯铁物种的接枝 Grafting of “Half-sandwich” Cyclopentadiene Iron Species into HY Supercage

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英文关键词: [HY zeolites](#) [ferrocene](#) [grafting reaction](#) [“half sandwich” cyclopentadiene iron](#)

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中文摘要:

在真空条件下研究了Cp<sub>2</sub>Fe在HY沸石表面的接枝反应,并用原位FTIR、ICP、XRD、TPD-MS和UV-Vis DRS等方法对接枝产物的组成、结构及性质进行了表征。结果表明,在低于423 K的温度下,Cp<sub>2</sub>Fe可以强吸附在沸石的超笼内,并被氧化为Cp<sub>2</sub>Fe<sup>+</sup>阳离子;当在423 K长时间加热时,Cp<sub>2</sub>Fe<sup>+</sup>可与超笼表面的酸性中心发生化学反应,脱除一个环戊二烯基团,在沸石超笼形成“半三明治”环戊二烯铁CpHFe(OZ≡)<sub>3</sub>(Z为沸石骨架Si或Al原子)表面物种。一个超笼中可接枝3个CpHFe基团,该物种在真空、惰性气体气氛和473 K以下能够在表面稳定存在。接枝反应不破坏HY的骨架结构,修饰后HY沸石的BET比表面积和微孔体积大约降低一半。

英文摘要:

The grafting reaction of Cp<sub>2</sub>Fe with Brønsted acid sites in HY zeolite supercages was studied under high vacuum condition. The chemical composition, structure and property of the grafted sample were characterized by in situ FTIR, ICP, XRD, TPD-MS and UV-Vis DRS. The results showed that Cp<sub>2</sub>Fe was adsorbed strongly in the supercages of zeolite at the temperature lower than 423 K, and was oxidized there into Cp<sub>2</sub>Fe<sup>+</sup> cation. When HY containing Cp<sub>2</sub>Fe was heated at 423 K for 3 h, the cation reacted with the acidic hydroxyl of zeolite to translate into a “half sandwich” cyclopentadiene iron species CpHFe(OZ≡)<sub>3</sub> (Z: Si or Al within the framework of zeolite) bonding on surface of the zeolite supercages by eliminating a Cp group. Three CpHFe groups could be grafted into a supercage, and existed stably in vacuum or helium atmosphere up to a temperature of 473 K. The grafting reaction did not destroy the framework of HY zeolite but made the BET surface area and microporous volume of the raw HY decreased.

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