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磁铅石型复合氧化物LaNi_xCo_(1-x)Al_(11)O_(19+δ)催化剂上CH_4和CO_2重整反应的研究

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摘要　考察了磁铅石型复合氧化物LaNi_(0.5)M_(0.5)Al_(11)O_(19 + δ) (M = Co, Fe, Mn, Cu)和LaNi_xCo_(1-x)Al_(11)O_(19+δ)催化剂在CH_4与CO_2重整制合成 气反应中的催化活性，并应用XRD，TPR，UV-DRS技术着重表征LaNi_xCo_(1-x)Al_ (11)O_(19+δ)催化剂的结构和性能。研究结果表明该系列催化剂具有相同的晶体结构和相似的还原稳定性。对不同过渡金属取代的催化剂来说，以LaNi_(0.5)Co_ (0.5)Al_(11)O_(19+δ)催化剂具有最好的反应活性。而对于LaNi_xCo_(1-x)Al_ (11)O_(19+δ)系列催化剂，当x≤0.375时，随x值的增大，催化活性明显提高， 但在0.375≤x≤1.0范围内，催化活性几乎保持不变。由此得到结论，对于此 反应来说，控制Ni量在0.375≤x≤0.50范围内比较合适。

关键词　氧化镧　氧化镍　氧化铝　甲烷　二氧化碳　重整反应　合成气　催化活性

分类号　0643

Study of Methane Reforming with Carbon Dioxide to Synthesis Gas over Magnetoplumbite Oxide LaNi_xCo_(1-x)Al_(11)O_(19+δ)

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Abstract The catalytic activities of magnetoplumbite oxides LaNi_(0.5)M_(0.5) Al_(11)O_(19 + δ) (M = Mn, Fe, Cu, Co) and LaNi_xCo_(1-x)Al_(11)O_(19 + δ) were studied for methane reforming with carbon dioxide to synthesis gas. The structure and physical properties of the series of LaNi_xCo_(1-x)Al_(11)O_(19 + δ) were characterized by means of XRD, TPR and UV-DRS. The results showed that this series of catalysts exhibited almost the same crystal structure and similar reduction stability. The reduced LaNi_(0.5)Co_(0.5)Al_(11)O_(19 + δ) exhibited the best catalytic activities. At x ≤ 0.375, the activities of the catalysts increased with the increase of x value. However, at 0.375 ≤ x ≤ 1.0, the activities of the catalysts were almost not changed.

Key words　LANTHANUM OXIDE　NICKEL OXIDE　ALUMINIUM OXIDE　METHANE　CARBON DIOXIDE　REFORMING REACTION　SYNTHETIC GAS　CATALYTIC ACTIVITY

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