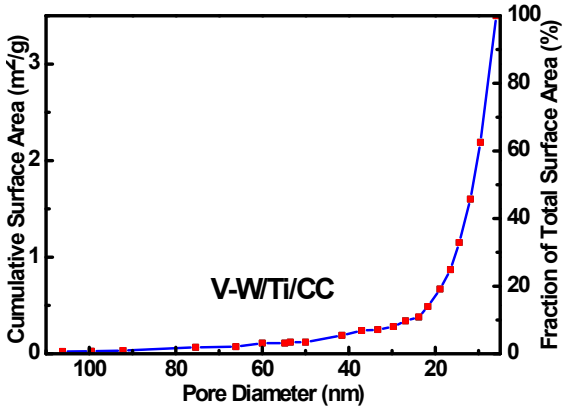

Fig. 1 Results of BJH desorption cumulative surface of area of pores over V-W/Ti/CC catalyst.

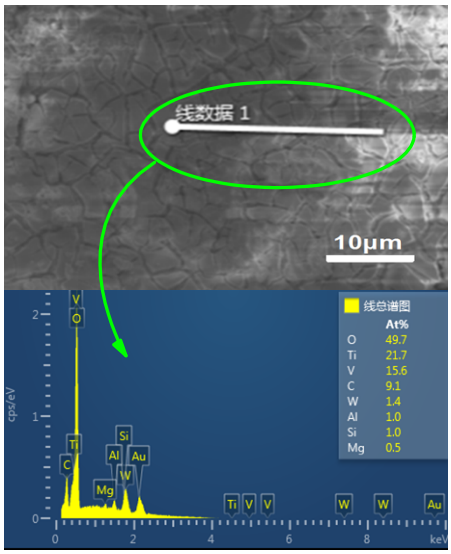

Fig. 2 EDS line scanning test of catalyst surface over sample V-W/Ti/CC

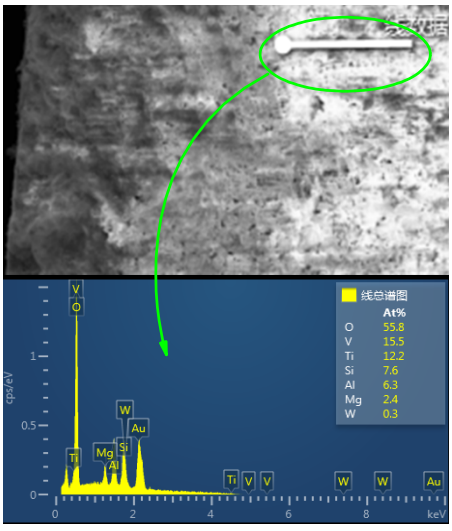

Fig. 3 EDS line scanning test of catalyst cross section over sample V-W/Ti/CC

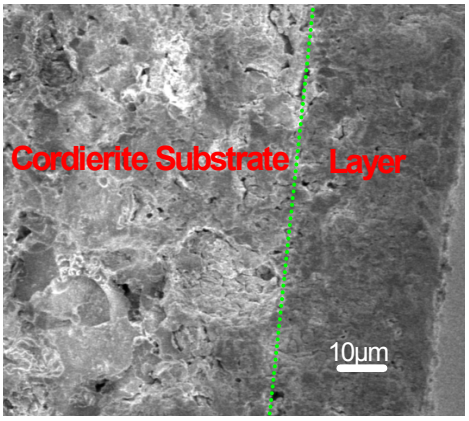

Fig. 4 SEM result of catalyst cross section over sample V-W/Ti/CC

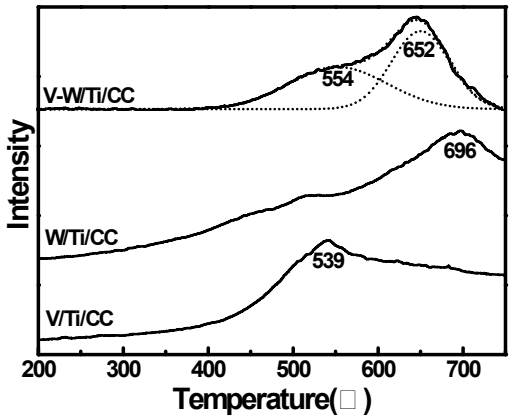

Fig. 5 H_2-TPR analysis of different samples. Testing conditions: H_2-temperature programmed reduction (H_2-TPR) experiments are performed in a quartz reactor connected to a thermal conductivity detector (TCD) with N_2-H_2 mixture (10% of H_2 by volume, 40 ml min^{-1}) as a reductant. Prior to the reduction, the sample (50 mg) is pretreated in a high purified N_2 stream at 400 ℃ for 1 h and then cooled to room temperature. After that, the TPR starts from room temperature to target temperature at a rate of 10 ℃ min^{-1}.

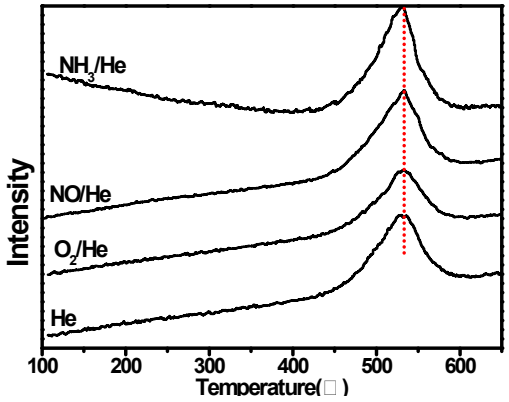

Fig. 6 Results of (NO, O_2, NH_3)-TPD over V-W/Ti/CC catalyst in He atmosphere. Testing conditions: 1 g V-W/Ti/CC powder were loaded in the

reactor and pretreated in an high-purity He stream (30 ml/min) at 400℃ for 1 h, then cooled to 100℃ in the same stream. The pretreated catalysts were then exposed to adsorbed gas respectively, containing NH_3 10 ml/min +He 30 ml/min or NO 10 ml/min +He 30 ml/min or O_2 10 ml/min +He 30ml/min or He 30ml/min, at a total flow rate of 40 ml/min. After steady state was reached, the catalysts were purged with high-purity He of 30 ml/min for 1 h, then heated at a rate of 10 ℃/min from 100℃ up to 700 ℃. The effluent were continuously monitored during the whole adsorption/desorption process by thermal conductivity detector.