



Fig.S1 XRD phase analysis of 6FeJXO15-800 and 6FeJXO15-800H

There are Fe-based components (such as Fe_3O_4 , Fe_2O_3 , FeO , Fe and Fe_3C) for 6FeJXO15-800, as shown in Fig. S1(a), indicating that FeCl_3 catalyst has reacted with some substances in coal during pyrolysis. To eliminate the interference of Fe-based compounds in chars for the results of XRD and Raman, some char samples including Fe-based compounds were treated by 0.2 mol L^{-1} HCl and washed with distilled water to remove chloride ions. After acid treatment, the diffraction peak of Fe-based components has disappeared in Fig. S1(b).