

The effects of oxide film on inner surface of pyrolysis furnace radiant coil

Liu, Y.¹, Huang, W.¹ and Wang, S.¹

¹ Sinopec Beijing Research Institute of Chemical Industry, Beijing, China

The ethylene pyrolysis furnace is an essential equipment in ethylene industry. However, formation of coke on inner surface of pyrolysis furnace radiant coil will obviously reduce the productive efficiency. In this work, the surface morphology and thickness of the oxide film on inner surface of the pyrolysis furnace radiant coil on service were investigated.

Figure 1 shows the surface morphology of the oxide films from four old pyrolysis furnace, and Figure 2 shows the surface morphology of the oxide films after coking test. As can be observed in Figure 2, 1#, 2# oxide film was covered with cotton-shaped coke, and the 3#, 4# oxide film was covered with filamentous coke. The results of the EDS line-scan of the oxide films was shown in Figure 3. The thickness of 1#, 2# oxide film was about 20 μm and the oxide films were compact. The thickness of 3#, 4# oxide film was about 40 μm and the oxide films were loosen.

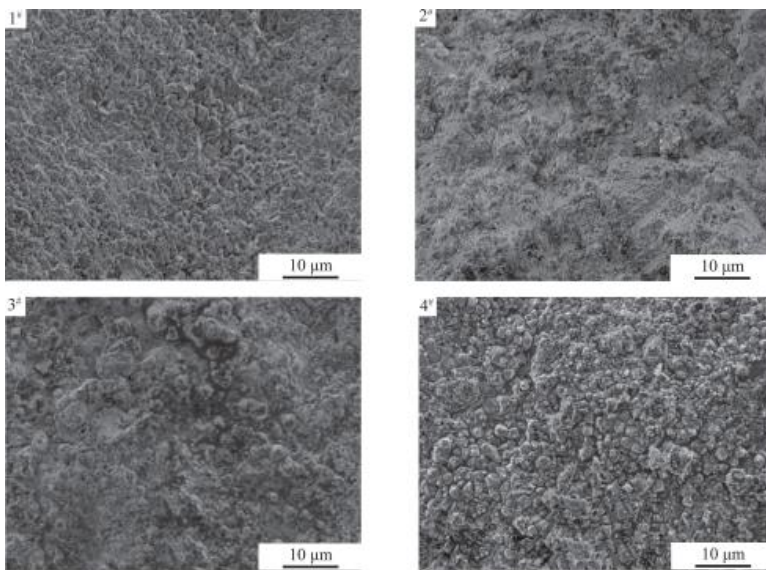


Figure 1. Surface morphology of the oxide films.

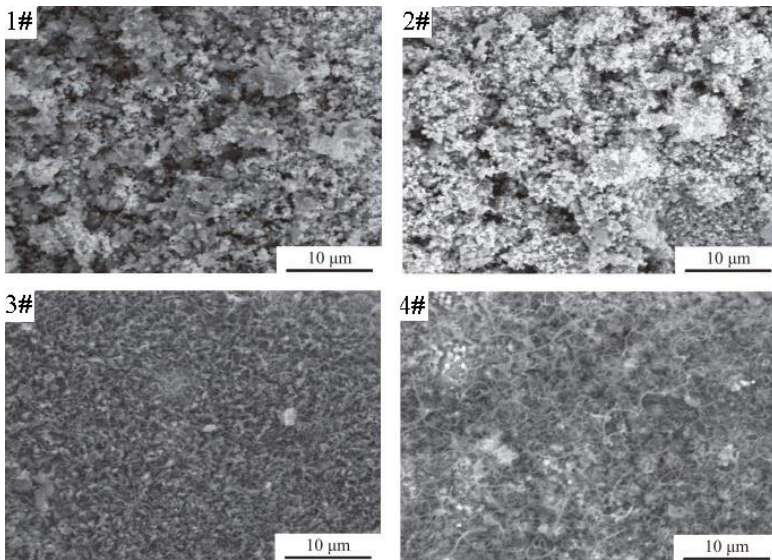


Figure 2. Surface morphology of the oxide films after coking.

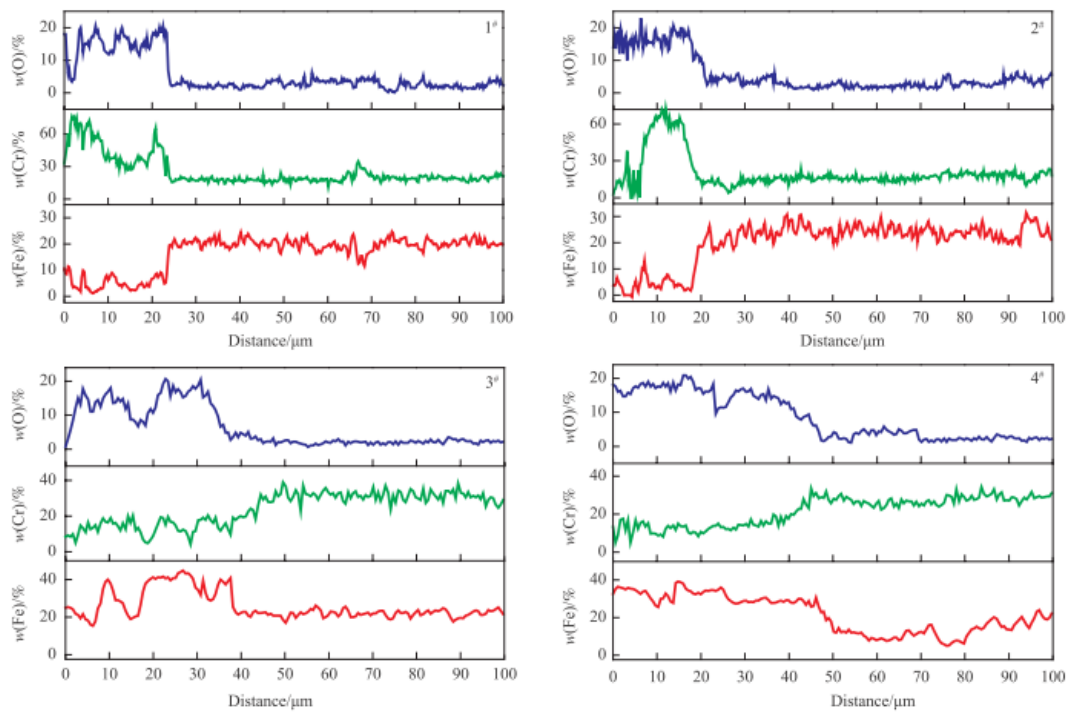


Figure 3. EDS line-scan of the oxide films.