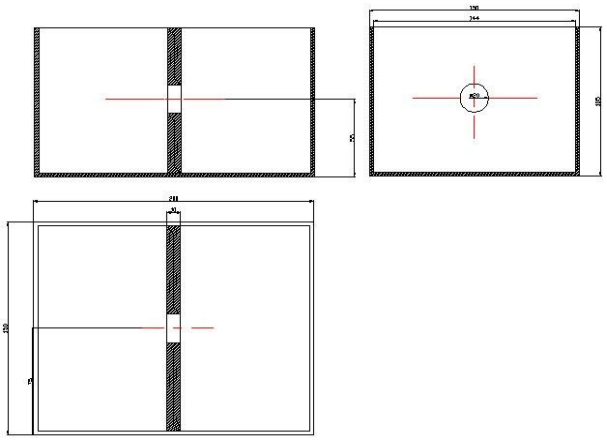

Figure 1. CAD three-view of the diffusion coefficient measuring device.

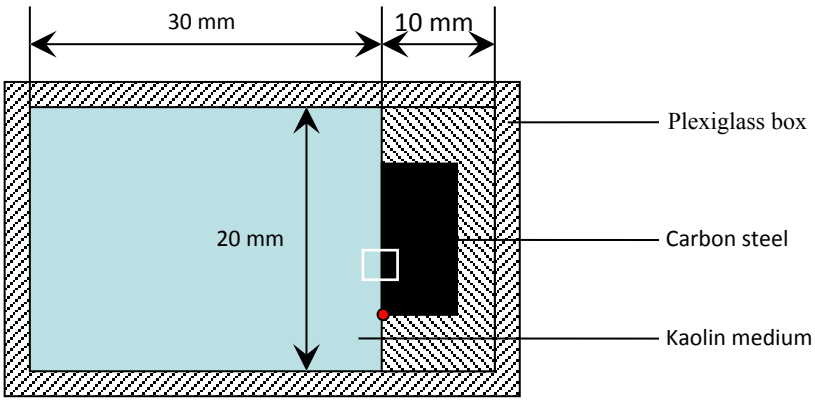

Figure 2. Schematic of the SKP test of carbon steel in kaolin medium, where the test area is marked with a white square.

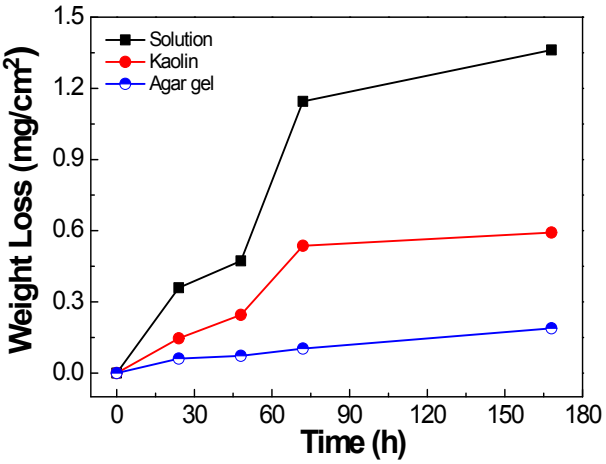

Figure 3. The weight loss curves of samples buried in three different media with different times.

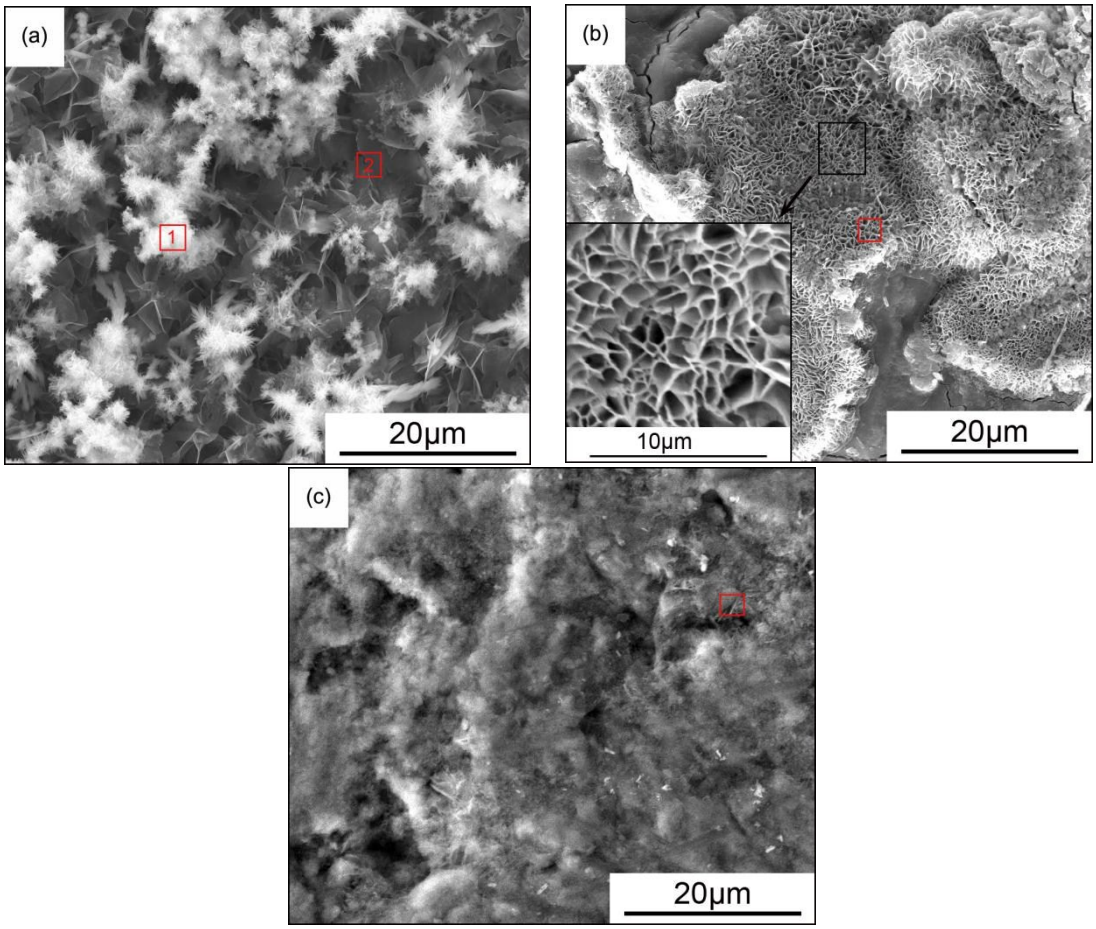

Figure 4. The SEM images of the corrosion products of carbon steel in three different simulated soil media. (a) Simulated solution for 24 h, (b) kaolin for 168 h, (c) agar gel for 168 h.

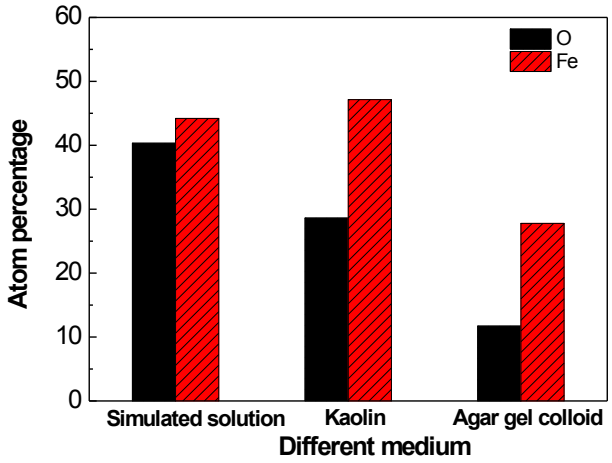

Figure 5. The ratio of the elements iron and oxygen in the corrosion products in different media.

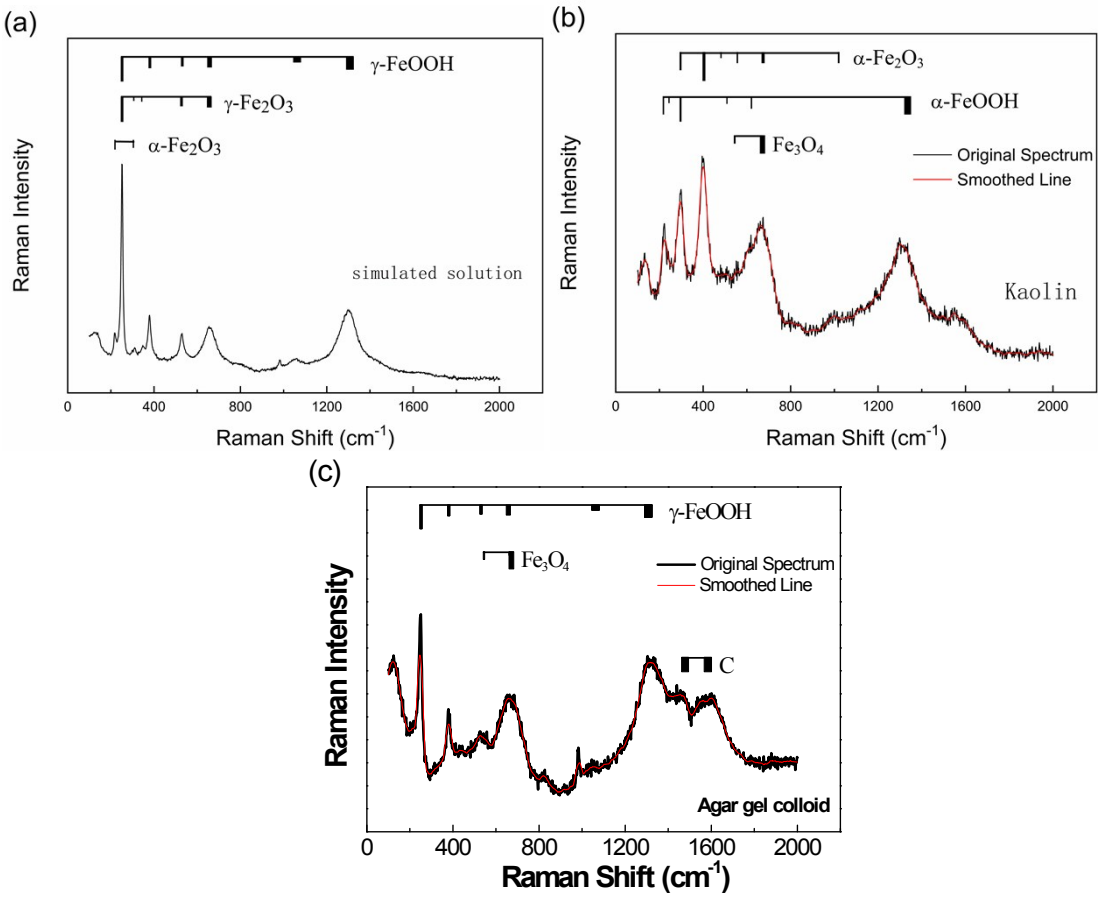

Figure 6. Raman spectra of the corrosion products of carbon steel in three different diffusion media after 168 h: (a) simulated solution, (b) kaolin, and (c) agar gel.

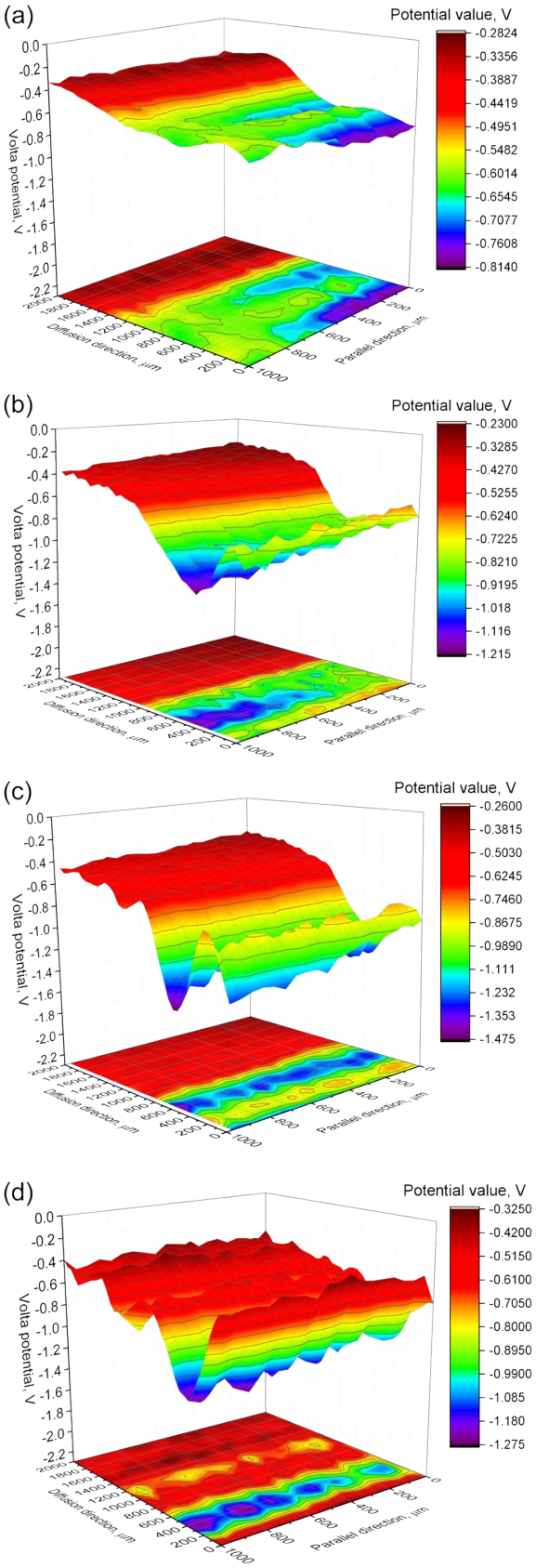

Figure 7. Potential distribution diagrams of SKP test of carbon steels in kaolin simulated medium for different times: (a) 0 h, (b) 24 h, (c) 72 h and (d) 168 h.

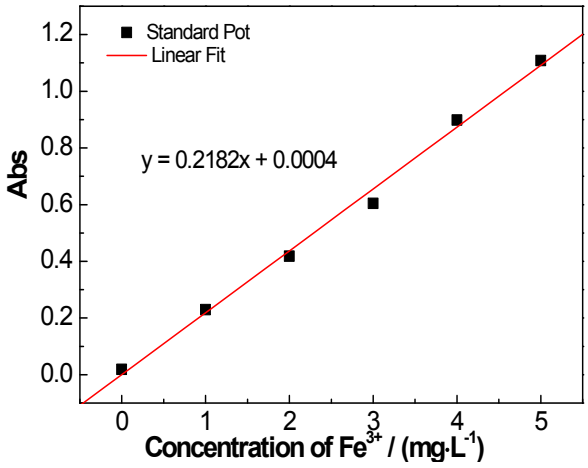

Figure 8. Iron standard curve measured by phenanthroline spectrophotometry, where the molar concentration of Fe^{3+} is 8.39×10^{-4} mol·L^{-1} after the conversions.

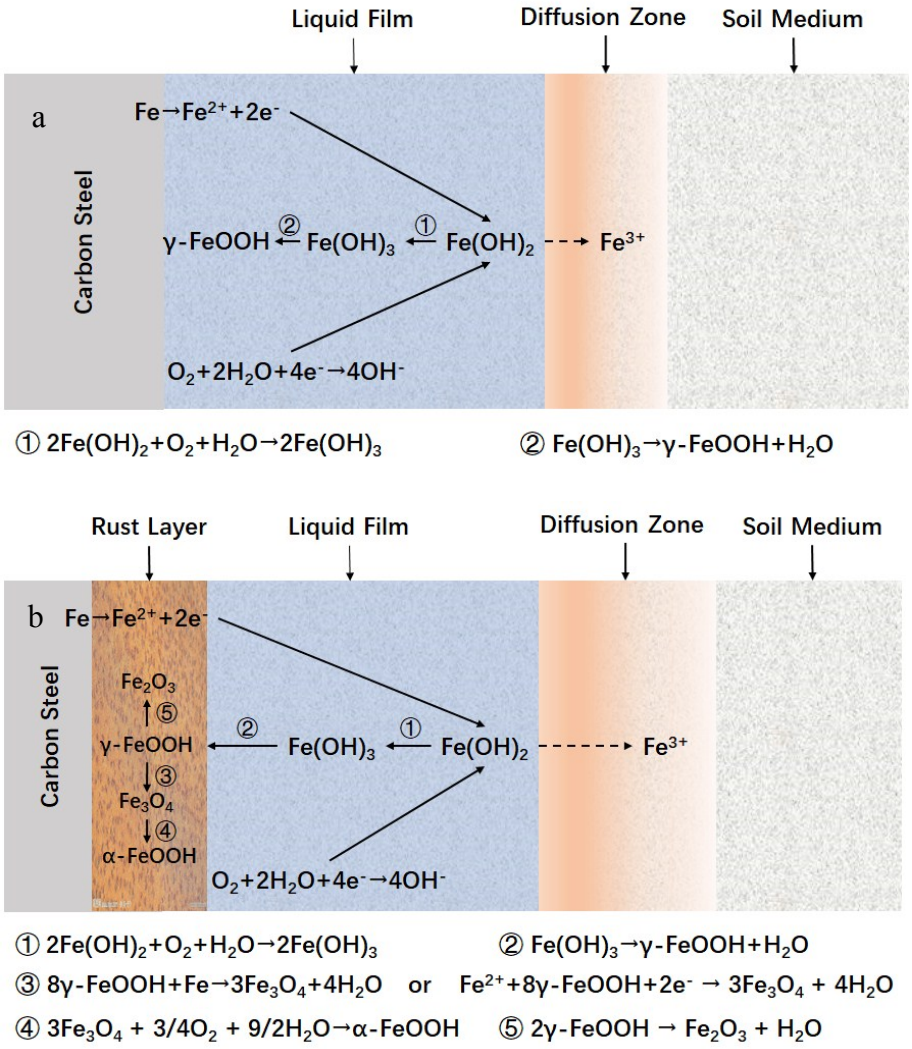

Figure 9. Corrosion products and the iron ion diffusion models of carbon steel, (a) the initial stage in corrosion processes and (b) development stage associated with the supplement of oxygen.