

论文

带锈铸铁与304不锈钢的电偶腐蚀

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摘要:

研究了在3.5% NaCl溶液中带锈铸铁和304不锈钢(SS304)之间的电偶腐蚀效应和特性, 以及面积比对电偶腐蚀效应的影响. 结果表明, SS304(面积为 A_c)与带锈铸铁(面积为 A_a)面积比 $S(A_c/A_a) \leq 16$ 时, 电偶电流大小取决于SS304表面在耦合电位时的阴极反应速率; 随着面积比 S 的增大, 电偶电流密度 I_{g/A_a} 增大, 但 I_{g/A_c} 降低, 而且受限于SS304表面氧扩散极限电流密度; 随面积比 S 的增大, 电偶腐蚀效应增大, 但相对来说, 电偶腐蚀效应是较小的. 面积比 S 太大时, 可能使本身为钝化态的SS304在偶接活化后发生阴极腐蚀. 建议 $S \leq 4$.

关键词: 带锈铸铁 304不锈钢 电偶腐蚀

GALVANIC CORROSION OF RUSTY CAST IRON AND 304 STAINLESS STEEL

Abstract:

To know galvanic effect of aging iron artifacts and supporting stainless steel plate, galvanic corrosion characteristic of rusty cast iron and 304 stainless steel (SS304) in the 3.5%NaCl solution have been studied. The influence of area ratio of the two materials on the galvanic effect has also been investigated. The results indicate that the galvanic current of rusty cast iron and SS304 is dependent on cathodic reaction rate on the surface of SS304 at galvanic potential when SS304/rusty cast iron area ratio $S \leq 16$. Furthermore, as the area ratio increases, galvanic current density I_{g/A_a} increases. But I_{g/A_c} reduces and is limited to oxygen diffusion limiting current density on the surface of SS304. With the increasing area ratio, galvanic effects rise but in general they are comparatively little in comparison with counterpart of common coupled metals. When the area ratio is too high, SS304, which is passive itself and then is activated after being coupled, may be suffered from cathodic corrosion. Therefore, area ratio S must not be too big in practical engineering. It is suggested that $S \leq 4$.

Keywords: rusty cast iron SS304 galvanic corrosion

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