

Effect of hydrogenase on the corrosion of mild steel

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Losses due to corrosion are evaluated at 4% of the GDP of industrialised countries and biocorrosion may be responsible for 10% of these costs [1]. Whereas the general mechanism of anaerobic corrosion, involving iron sulphur deposits, seems now well agreed, the detailed mechanism is still unclear and the implication of hydrogenase is very controversial. The influence of a [Fe] hydrogenase from *C. acetobutylicum* on mild steel corrosion was studied using a galvanic cell and measuring the current and the free potential. This hydrogenase seems to induce pitting corrosion. The mechanism is discussed using activated and deactivated enzyme and the possible influence of phosphate is highlighted. In the galvanic cell, the presence of hydrogenase on the surface of only one electrode induced a galvanic current up to 10 μ A and the potential decreased by 500mV in the presence of phosphate. MEB and EDX analysis confirmed the presence of a vivianite deposit which forms a protective barrier to corrosion [2]. It seems that either type of hydrogenase ([Fe] or [Ni-Fe]) has a significant role in initiating corrosion [3, 4].

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