Effect of thermal treatment of carbon felt used as substract to polyaniline electrosynthesis

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Heat treatment temperature (HTT) of carbon felts influences on anchoring sites and growth conducting polymer layers applied in eletronic devices. This work aims optimize HTT of carbon felts, namely 1100, 1300 e 2000ºC. Polyaniline (PAni) is obtained on felt by 3 voltammetric cycles in aniline 0,5 mol L^{-1} and 1 mol L^{-1} H_2SO_4, scanning from-0,50 to 1,05 V x Ag/AgCl, at 25 mV s^{-1}, using Pt as counterelectrode. The characterization of composite was made by scanning electronic microscopy (SEM), X-ray diffraction (XRD), FT-IR Spectroscopy and electrochemical impedance spectroscopy (EIS). The HTT increasing favored more intense and uniform growth of PAni on felts. XRD allowed seeing that changing of crystallinity is very sensible to HTT. So, crystal growth is set by felt structure: at 1100ºC, there is crystal formation at (001), but at low intensity; at 1300ºC, a polycrystalline material is formed; and at 2000ºC, there is a tendency of monocrystal formation. By FT-IR, ratio between quinoid and benzenoid rings contributions was unchanged, suggesting no variation of oxidation degree with HTT. PAni obtained is form between leucoesmeraldine and esmeraldine, but all of them with presence of band related to electric condutivity from acid doping and remarkable alignment of benzenoid forms to PAni grown on felt treated at 1100ºC. EIS revealed three felts with different electrochemical characteristics: carbon felt treated at 1100ºC shows lowest resistivity and highest capacitance due to intense presence of oxygen groups, and so, highest affinity with aqueous solutions. However, when these felts exposed to eletcrosynthesis, it was noticed higher sensibility to higher HTT, for which capacitance increased and resistivity decreased, but very similar between HTT 1300 e 2000ºC, with different diffusive effects more pronounced at 1300ºC. Felt treated at 1100ºC has higher facility of charge electric attraction to allow initial growth of layers, due to higher affinity with aqueous solution.