Effect of heat treatment temperature on the electrochemical properties of reticulated vitreous carbon with two different porous sizes.

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Reticulated Vitreous Carbon(RVC) is a material known by high mechanical resistance, porosity and relatively high electrical conductivity, which have been extensively explored in applications, such as thermal coating of airspace vehicles, molecular sieves and electrocatalyst. Besides, porous carbon materials are used to batteries and capacitors. Porosity enables diffusive or convective transport of electroactive species within electrodes, thus providing high specific surface area, increasing rates of electron transfer reactions. RVC treated at different temperatures (HTT) was investigated. The effect of the temperature was analyzed at two different pore size distribution 40ppi (pores per inch) and 70ppi. Surface morphology and porous sizes were analyzed using *Field Emission Gun Scanning Electron Microscopy* (FEGSEM). *Cyclic Voltammetry* (CV) and *Electrochemical Impedance Spectroscopy* (EIS) were carried at room temperature. All curves display peaks related to the oxidation and subsequent reduction of the redox couple. The results show a strong dependency with HTT and porous size distribution. RVC 40 ppi present unreversible behavior to higher HTT, being *quasi* reversible to 1100ºC. By other hand, RVC 70 ppi has *quasi* reversible behavior to all HTT range. Furthermore, RVC 70 ppi is insensitive in relation to electrochemical area *vs* HTT, while 40 ppi samples decreases this area with HTT increasing. This result is probably related with electrical interaction of electrode surface with aqueous solution, added to capillary effects. This affinity level is more pronounced in 40ppi samples, for which solution resistance is very high to HTT lower than 1300°C, hydrophilic samples. These HTT allow presence of polar groups related to heteroatoms. To 70 ppi samples, the change in this effect is unpronounced. The results revealed that electrical behaviour, porosity and affinity with water competes between them, and influence in charge attraction, affecting the reversibility of the RVC.