Plasmatic Events during Electrolysis of Aqueous Solutions

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The goal of the research was to understand the processes going on under high voltage electrolysis and to bring attention to the possible applications of the new scientific field. Electrolysis of aqueous solutions was carried out and when a specific voltage was reached, plasma events occured. Whether the plasma phenomenon appeared at the cathode or at the anode depends on the specific parameters of the electrolytic cell. On both electrodes the plasma reactions have different effects. It was observed that at the cathode there is a much more violent reaction with strong light emissions and a plasma forming around the electrode. On the other hand the impact at the anode is a different one, because there are just small but intense electric discharges that form only a partial and changing micro plasma. Therefore those events lead to very interesting conditions in the plasma reaction spaces. At the negative charged electrode the intense Plasma can be used for energetic procedures because of the outstanding efficiency of the process. Whereas at the positive charged electrode the oxidation process combined with micro discharges lead to ceramic coatings on specific anode materials with unique properties. Even extremely thin semiconducting surfaces can be formed. In summary the High Voltage Electrolysis opens a completely new field of plasma chemistry with very less effort.

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