

Chemical Engineering

September 12-14, 2016 Phoenix, USA

Energy efficiency of a fuel cell for environmental purposes

Dragomir S Yankov, M Martinov, E Razkazova-Velkova and S Stefanov
Bulgarian Academy of Sciences, Bulgaria

A study for simultaneous removal of sulfides and nitrates from different wastewaters by oxidation of the sulfides to sulfates and reduction of the nitrates to nitrogen is presented. By recombination of the waste sulfides and nitrates containing fluxes into the anode and cathode compartment treatment of both of them can be achieved and as result, energy is released which can be used. The processes are carried out in newly designed fuel cell. The aim of the work is to improve the energy efficiency of the fuel cell by minimizing internal losses by optimizing the material, design and position of the electrodes. The configuration of the fuel cell consists of two concentrically arranged compartments separated by a membrane situated at the bottom of the inner unit. A commercially available Celgard 3510 membrane is used. The influence of the type of the electrodes, their specific surface on the electrical resistance and the obtained power are presented. The investigated electrodes are graphite rods and specially synthesized by us material on the base of structured activated carbon. Activated carbon (Fujikasau, Japan, 680 m²/g) is added for increasing the surface into the cathode compartment and intensification of the nitrate treatment process. Results for the depletion of the sulfide and nitrate ions are also presented.

Biography

Dragomir S Yankov is the Director of Institute of Chemical Engineering, Bulgarian Academy of Sciences. He earned his MSc degree in Chemistry (Chemical Cybernetics) from Sofia University, Bulgaria in the year 1984. He has worked at Institute of Chemical Engineering throughout his professional career. He joined the Institute as a Research Fellow in the year 1984, where he received his PhD degree. He is currently a Professor in Chemical Engineering. He is a member of the Editorial Board of the *Bulgarian Chemical Communications* and *Journal of Advanced Chemical Engineering*.

yanpe@bas.bg

Notes: