POLITECHNIKA ŚLĄSKA

WYDZIAŁ GÓRNICTWA I GEOLOGII

Sylwia Skoczyńska-Gajda

PRACA DOKTORSKA

„SAMOOCZYSZCZANIE I REMEDIACJA ZAKWASZONYCH ZBIORNIKÓW WODNYCH NA OBSZARACH DAWNEJ EKSPLOATACJI WĘGLA BRUNATNEGO W REJONIE ŁĘKNICY (ŁUK MUŻAKOWA)”

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"Self-purification and remediation of acidify reservoirs on the area of past lignite exploitation near Łęknica (Muskau Arch)"

Abstract

Exploitation of lignite coal on the area of Muskau Arch, which started in second part of XIX century and finished in 1974, caused the formation of the biggest in Poland group of artificial lakes called in literature "antropogenic district". Their chemical constitution is formed as a result of intensive weathering of pyrite (FeS_2) occuring in miocene lignite-bearing rock. This process leading to form Acid Mine Drainage and finally acidification of water from antropogenic lakes. Characterization of hydrogeochemical system of acidify reservoirs, determination the possibility of their self-purification and selection of water remediation method were the aims of the work. The conducted researches included i.a. characterization of: water system of investigated area (therein water and bottom sediments chemistry), hydrogeochemical processes occuring in analysed system and mineralogical and petrografical constitution of coal wastes formed the embankment of reservoirs. Additionally, the kinetic model of Acid Mine Drainage formation in analysed environment was worked out, using the software The Geochemist's Workbench 7.0. The efficiency of water system self-purification was evaluated, based on analysis of changes in water chemistry, have occured at the turn of the last twenty years. Furthermore, the theoretical time needed for neutralization of acidify water was defined, using computer simulation. The selection of appropriate water remediation method was achived, based on the results of mathematical modeling and laboratorial experiments.