

Geochemical characterization of ultrabasic rock and its potential on acid mine drainage treatment

ABSTRACT

Study area located at Ranau district and ex-Mamut copper mine site. The geological background of Ranau consist of several rock units including the ultrabasic rock. Ultrabasic rock in Ranau has undergone a metamorphism process to form serpentinite rock. The acid mine water outflow from the Mamut copper mine site has spread into the surrounding area through several major river that used by the residents. Treatment using ultrabasic rock was conducted to observe the potential of the rocks as an effective method for passive treatment of acid mine drainage. Limestone was used as an additional material on this treatment. Column test shows the reactive materials, serpentinitized peridotite (P) increase the value of pH up to 26.5% (pH 2.9 to 4.0) and able to get rid of the Fe element up to 100% with the increase of time but did not get rid of the Cr, Co, and Ni elements. Meanwhile with the additional of carbonates, the pH value effectively increased up to 56.44% (pH 2.9 to 6.75) and can remove all metal elements with Fe, Cr and Cu elements reaching 100% removal. Whereas Co and Ni element can be removed up to 37% and 50% respectively. As a conclusion, the ultrabasic rock that used in this acid mine water treatment need carbonated materials to increase the pH and to remove the heavy metals elements.