pH REDUCTION OF HIGH ALKALINE RAW WATER BY PYRITE

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by

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Abstract

The pH is one of the water quality parameters that governs by the differential presences of admixtures. pH level of some surface and underground water sources exceed 8.5 indicates that high alkaline water. Careful attention to pH control is necessary at all stages of water treatment to ensure satisfactory ion removal by oxidation, water clarification and disinfection. Therefore effective pH reduction method is necessary for water treatment plant.

The oxidation of pyrite, the most abundant of all metal sulfide minerals, is the dominant process giving rise to the acidification of natural waters (Rimstidt, 2002). As pyrite has tendency of producing H^+ and lower the pH, this research focus to finding out ability of pyrite to reduce the pH of alkaline raw water that used in water treatment plants. Also, it identifies the effect of other water quality parameters such as hardness, alkalinity, Arsenic (As), Turbidity, Color, Electrical Conductivity (EC) and Total Iron concentration with the use of pyrite.

Reaction of three fractions of pyrite samples with distilled water, raw water and filtered water from GKWTP and synthesized alkaline water was studied to determine produced acid concentration, pH reduction ability and change of other water quality parameters. Effect of aeration of water was also studied. Results showed that the pH of raw water was reduced than filtered or synthesized alkaline water. Color and turbidity of the raw water was significantly reduced. Produced acid concentration was depend on the particle size. Aeration can increase the effectiveness of pH reduction ability. pH reduction of filtered water or synthesized alkaline water by pyrite was not effective as it cause to increase color, turbidity, Fe^{2+} and SO_4^{2-} concentration in water. Data from these experiments and future experiments will help researchers gain a better understanding of the use of pyrite (as filter media) as effective pH reduction method.