



A temperature-mediated precipitation of struvite-family crystals in wastewater

S. Sutiyono¹, L. Edahwati¹, S. Muryanto², J. Jamari³, A. P. Bayuseno^{3*}

¹Department of Chemical Engineering, Universitas Pembangunan Nasional "Veteran" Jawa Timur, Surabaya 60294, Indonesia

²Department of Chemical Engineering, UNTAG University, Bendhan Dhuwur Campus, Semarang 50233, Indonesia

³Department of Mechanical Engineering, Diponegoro University, Tembalang Kampus, Semarang 50275, Indonesia

Abstract : The paper presents results of the investigation into the temperature mediated mineralogical formation of struvite family crystals in a synthetic wastewater. The scale-forming solution was set-up by mixing solutions of $MgCl_2$ and $NH_4H_2PO_4$ with Mg^{+2} , NH_4^+ and PO_4^{-3} in a molar ratio (MAP) of 1:1:1. The temperature was altered: 30, 35 and 40 °C. The initial pH of the solution was set up in 9.0. SEM (equipped with EDX) analysis revealed that the crystals have a needle like-shaped morphology, and contained Mg, K, P, and O as the main composition. The Rietveld analysis of the XRPD pattern confirmed that the major phase of struvite, and struvite-(K) formed in the precipitating solids. Apparently, bobierrite and newberyte were other phosphate minerals formed at the temperature of 35 °C. Analysis of this experimental data suggested that the temperature-mediated crystallization process yielded a potential optimization of struvite precipitation.

Keywords- Bobierrite, Newberyte, Struvite, Temperature, XRPD Rietveld method.

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