Reduction of toxic gases from hydrolysis reaction of secondary aluminium dross
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Abstract: Nowadays, people use a lot of aluminium in many ways because it has several properties such as high strength, high scratch resistance and low weight. Aluminium waste can be recycled by annealing process which products are pure aluminium and aluminium dross; Aluminium dross is hazardous waste which contains various compounds such as aluminium nitrile, aluminium sulfide, aluminium phosphide and salt. When aluminium dross contacts water or moisture in air it produces odorous gases such as ammonia, hydrogen sulfide and hydrogen phosphide. These gases are affecting human and the environment. This research proposes a way for trapping toxic gases from hydrolysis process by hydrochloric acid, potassium permanganate and ethylene glycol. Hydrolysis processes use hydrochloric acid and sodium hydroxide for accelerating the reaction. The aluminium dross as received was characterized by X-ray diffraction (XRD). After being hydrolyzed by base and acid, gas generated 680 and 810 ml, respectively. Alkaline solution generated ammonia 260 ppm. Acid solution showed higher reaction rate and generated hydrogen sulfide 296 ppm and phosphide 280 ppm. The trapping toxic gases was performed by Gas detector tube. Hydrochloric acid 0.01 M 100 ml and Potassium permanganate 0.01 M 200 ml can be successful for trapping ammonia and hydrogen sulfide, respectively.

Keywords: Aluminium dross; Reduction toxic gas