Modeling and simulation of the industrial reactor for carbon dioxide absorption into activated potassium carbonate aqueous solutions

Maria IVANICIUC and Ilie SIMINICEANU

"Gh.Asachi" University, Mangeron Blvd. 71A, 6600 Jassy, Romania

Abstract The aim of this study was to investigate the influence of the replacement of ceramic Intalox saddles by Pall metallic rings on the final carbon dioxide concentration in the ammonia synthesis gas, subsequently purified by methanation. The accuracy of the mathematical model of the carbon dioxide absorption into potassium carbonate activated aqueous solution has been evaluated by comparison of the measured and computed values of CO_2 and H_2O molar fractions in the treated gas. The deviations were not greater than 0.76% for H_2O and 4,0% for CO_2 molar fractions in the purified gas. The model experimentally tested has been applied for the simulation of the industrial column equipped with the new packing. The results show superior performances in the same operating conditions.

Keywords: mathematical model, carbon dioxide concentration, potassium carbonate, ammonia synthesis gas.