# A Fundamental Model of Polymer Washing Batch Process

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After the condensation polymerization reaction, impurities composed of adduct and used solvent remain inside the formed polymer. So it is necessary to remove these impurities by washing for improving the purity of the polymer. A fundamental model is proposed to predict the pH changes of polymer washing batch process which is generally used as the criteria of washing. The model covers quasi steady state approximation for impurity distribution inside the polymer with concepts of moving boundary of diffusion, impurity diffusion rate with Fick's law, mole balance of impurity, and equilibrium phase concentrations of impurity for each batches. The diffusion coefficient is estimated from experimental data of SPAEK(sulfonated poly(aryl ether ketone)) sample using empirical method with the dimensionless number indicating the ratio of impurity concentration in wash water to initial impurity concentration inside the polymer. The impurity concentration and pH of wash water according to time are calculated using the model and validated by comparing simulation results with the other experimental data. The proposed model is expected to provide fundamental theoretical basis of designing the optimal washing process.