**Optimized and functionalized paper sludge activated with potassium fluoride for single and binary adsorption of reactive dyes**

**Abstract**

The yield and adsorption uptake of optimized paper sludge activated carbon (PSAC) prepared using potassium fluoride as alternative chemical activation agent was investigated. The PSAC was functionalized with ethylenediamine (FPSAC) and both adsorbents were used for single and binary adsorption of Reactive orange 16 (RO16) and Reactive blue 19 (RB19). Effect of pH on the adsorption process, equilibrium, kinetics, isotherm and thermodynamic studies were carried out. Optimum PSAC preparation parameters were: activation temperature, X1 = 810 8C; activation time, X2 = 105 min; and impregnation ratio, X3 = 0.95 which gave adsorption uptake of 178 and 158 mg/g for RO16 and RB19, respectively.