

# APPLICATION OF A NEW BREAKTHROUGH MODEL FOR INDUSTRIAL AIR PURIFYING CARTRIDGES

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A recently developed breakthrough model is applied for toxic industrial chemicals (TICs) on adsorptive and reactive industrial air purifying cartridges. The all-new model is based on two fundamental assumptions. These are firstly, that for a constant feed adsorption process, the dimensionless chemical potential changes exponentially along the flow direction and, secondly, that the speed of the concentration wave accelerates with time as it passes through the bed. Our results show that the model is capable of accurately simulating the breakthrough curve over several orders of magnitude concentration making it especially useful for describing and predicting breakthrough behaviour of toxic chemicals with more favourable adsorption isotherms. All the parameters have well-defined physical significance. Thus the model can be made predictive if the sensitivities of the model parameters are determined. Simulation results also show that the model can be applied to both adsorptive and reactive adsorbate/adsorbent systems.