

Maria Agualeles (Universitat de Girona)

Averaged equations for column adsorption models: a revision of assumptions and hypothesis.

Abstract: We will start by considering the advection-diffusion equation that gives the evolution in space and time of the amount of contaminant in a polluted gas that flows through a sorption column. The original equation holds over the aerial part of the column and does not directly account for the lost of contaminant due to adsorption, which in fact appears as a boundary condition at the adsorbent's surface. Furthermore, the aerial part of the column is a three dimensional space domain which is far from trivial. By assuming a set of (quite reasonable) hypothesis one can reduce this original equation to an advection-diffusion equation with a sink term (that accounts for the loss of mass due to adsorption) for the average concentration of pollutant at each column cross-section. This reduces the space domain to one dimension which makes the equation analytically more tractable. In this talk I will go through the steps that allow to obtain the averaged equations putting special emphasis on the set of assumptions that are made are each step opening a discussion on how reasonable each of them is and how crucial it is in terms of providing a mathematically tractable system.