

Simulation of conformality of ALD growth inside lateral channels: comparison between a diffusion-reaction model and a ballistic model

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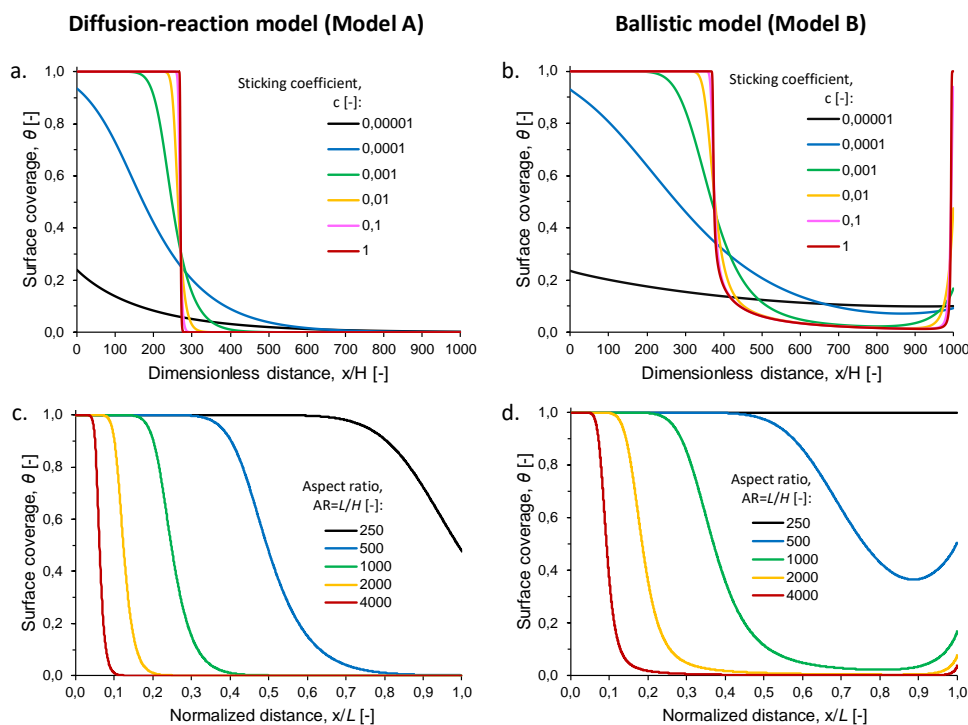


Figure 1. Effect of sticking coefficient (a, b) and aspect ratio (c, d) on saturation profiles obtained from the diffusion-reaction model (Model A)<sup>1,2</sup> and the ballistic model (Model B).<sup>3,4</sup> The base case conditions are:  $T=573$  K,  $p_A=10$  Pa,  $d_A=6 \times 10^{-10}$  m,  $M_A=0,1$  kg/mol,  $H=5 \times 10^{-7}$  m,  $L=5 \times 10^{-4}$  m,  $t_1=1$  s,  $c=10^{-3}$ ,  $Pd=10^{-4}$ ,  $q=4 \times 10^{-18}$  m<sup>-2</sup>. Each plot legend indicates the values of the varied parameters. For panels c and d,  $H$  was varied to reach the desired AR.

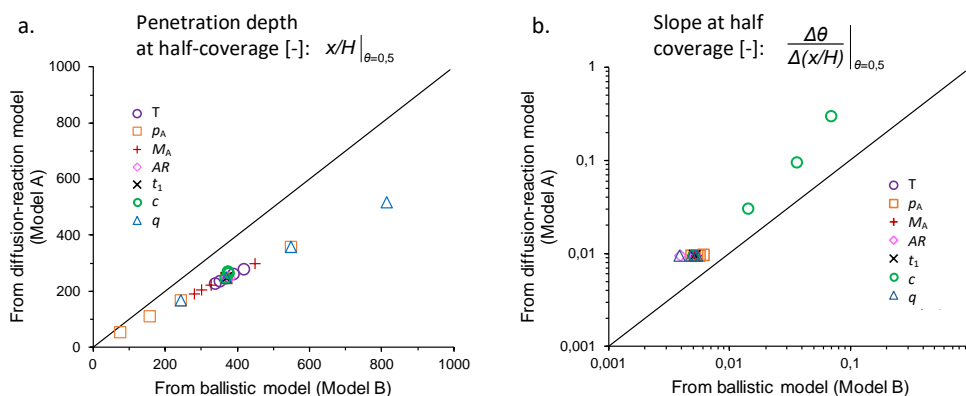


Figure 2. Comparison of features extracted from the saturation profiles: (a) penetration depth at half-coverage and (b) absolute value of the slope at half-coverage obtained from Model A and Model B at different operating conditions. Base case conditions similar to Figure 1. Parameters were varied one at the time in the following ranges:  $T=373$  to  $773$  K,  $p_A=1$  to  $20$  Pa,  $M_A=0.05$  to  $0.25$  kg/mol,  $AR=4000$  to  $250$ ,  $t_1=0.01$  to  $100$  s,  $c=10^{-5}$  to  $10^0$ ,  $q=0.5 \times 10^{-18}$  to  $8 \times 10^{-18}$  m<sup>-2</sup>. Saturation profiles with no clear adsorption front were excluded. The reference line shows a situation where the absolute value of the slope obtained from the models would be identical.

References

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