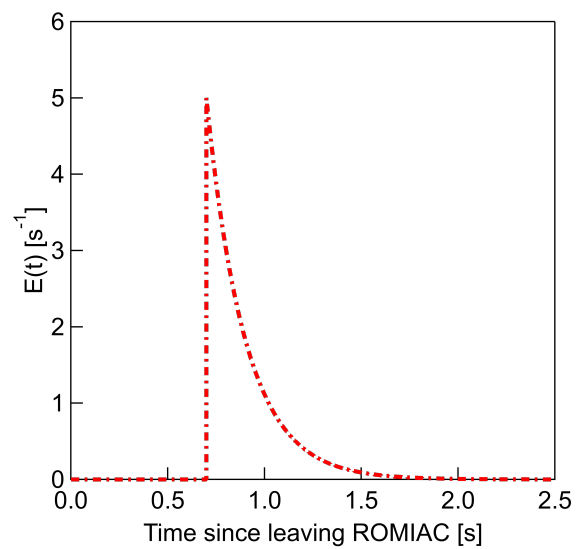**Figure S1.** Finite-element simulations of particle trajectories at $d_p = 20.8$ nm with different ramp time, $t_{ramp} = 3, 6, 12, 25, 50, 100$ s, from top left to bottom right, respectively. Particles were assumed to be nondiffusive. The simulation was conducted with the flow setting $Q_x/Q_a = 10$ LPM/1 LPM. The color bar indicates the time at which the particles leave the classifying ROMIAC.

Figure S2. CPC residence time distribution fitting using PFR-CSTR in series. The residence time distribution in the CPC can be computed by deconvoluting the quasi-static nSEMS transfer function measured with $t_{\text{ramp}} = 1400$ s, from that measured with $t_{\text{ramp}} = 50$ s. The CPC was modeled as a PFR in series with a CSTR and the mean residence time of the PFR, τ_{p}, 0.7 s and that of the CSTR, τ_{c}, is 0.2 s