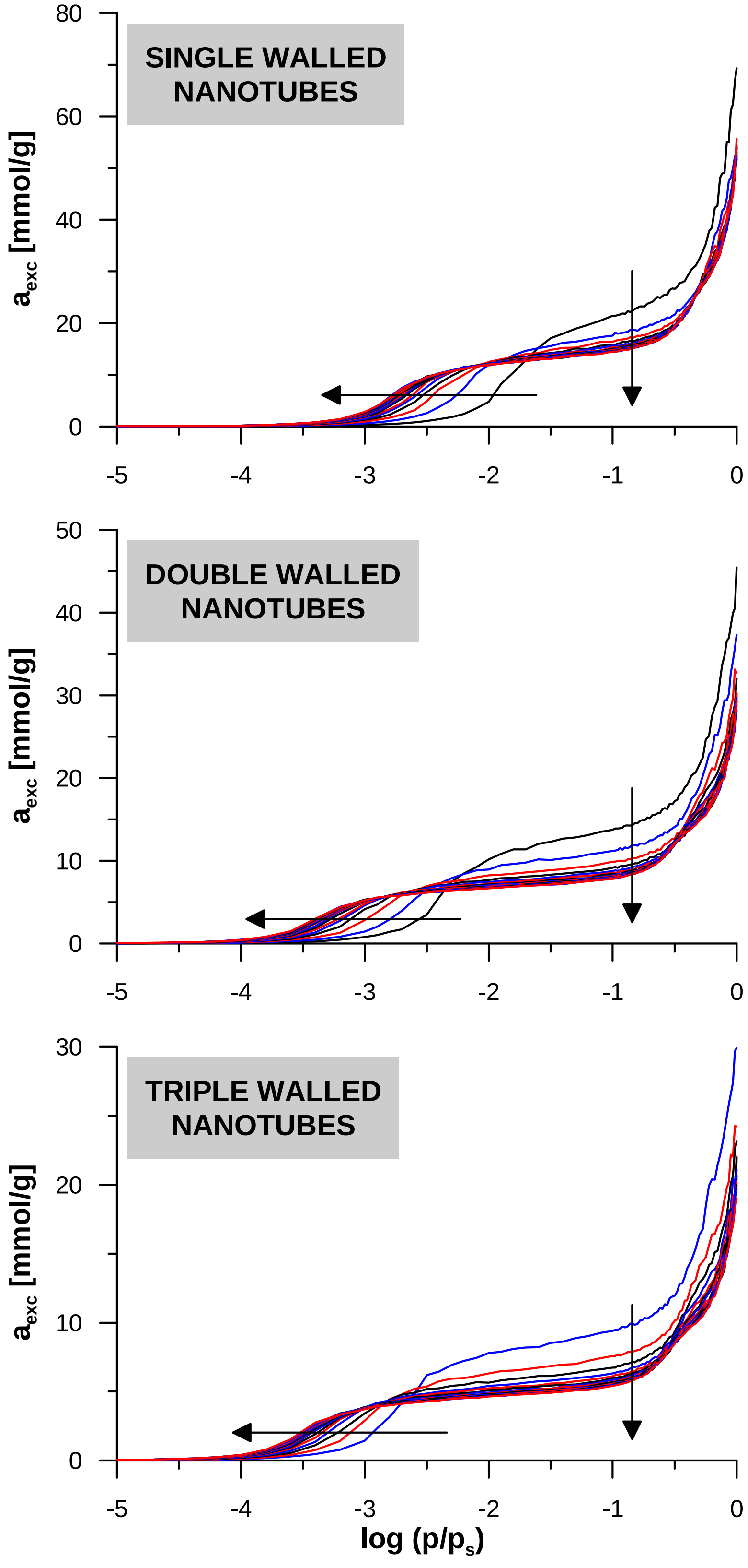

Fig. S1. The influence of tube diameter on the plots of simulated nitrogen adsorption isotherms (T=77.3 K). Arrows show the rise in tube diameter.

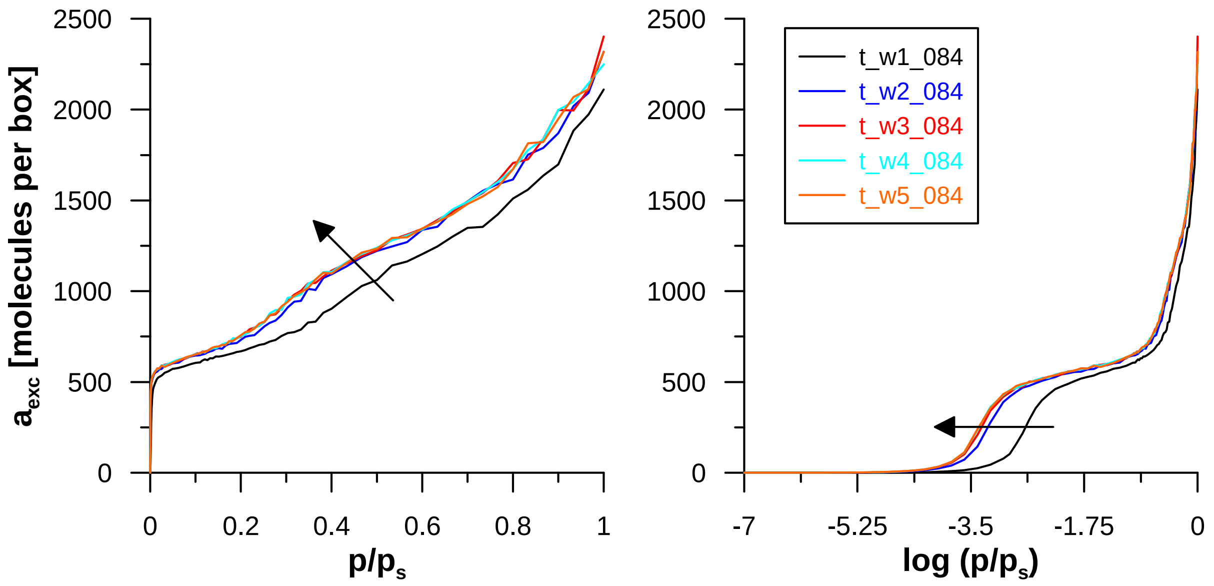

Fig. S2. The influence of the number of tube layers on the plot of adsorption isotherms (for adsorbents where the external tube is (84,0)). Arrow shows the rise in the number of layers.

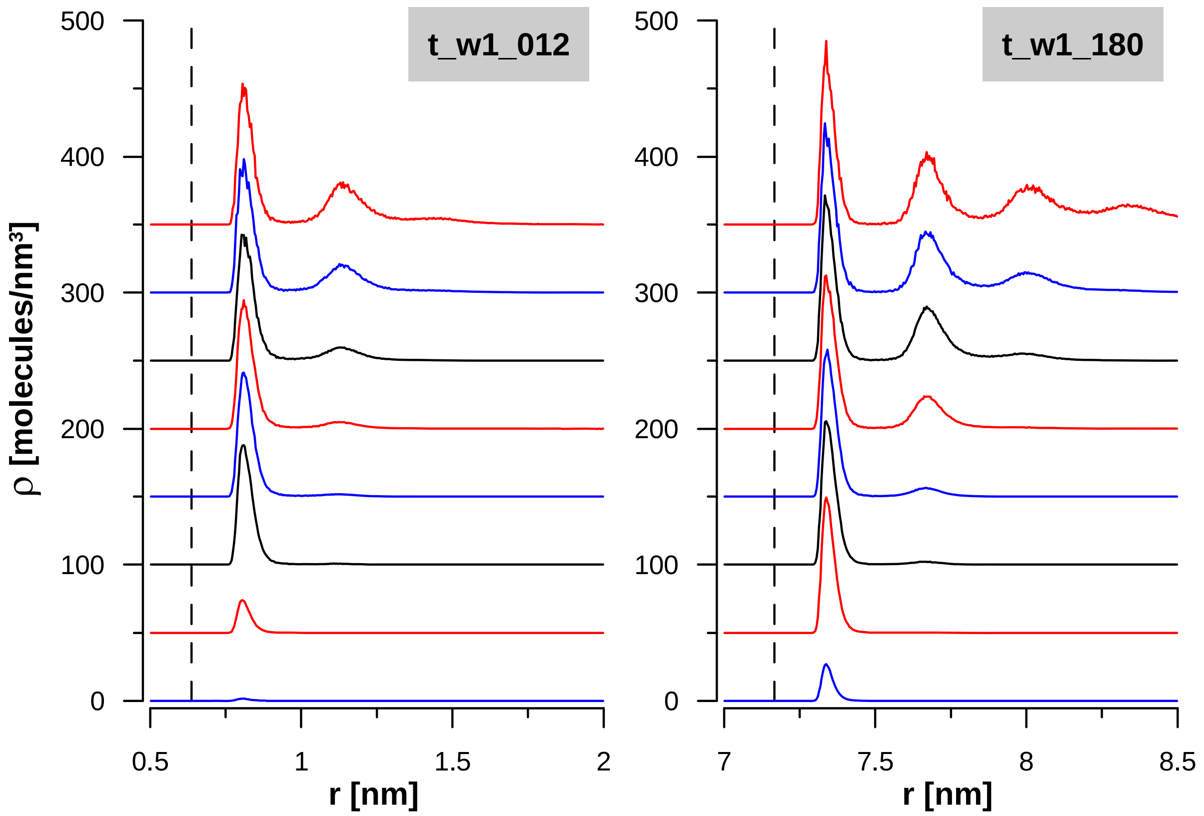

Fig. S3. Density profiles of nitrogen molecules plotted as a function of the distance from the central axis of the smallest and largest studied SWNTs for selected pressure values (from bottom up to the top: 0.001, 0.01, 0.1, 0.2, 0.4, 0.6, 0.8 and 1.0, note that each density is shifted by 50 molecules/nm^3 with regard to the former, solid line – the effective tube diameter).

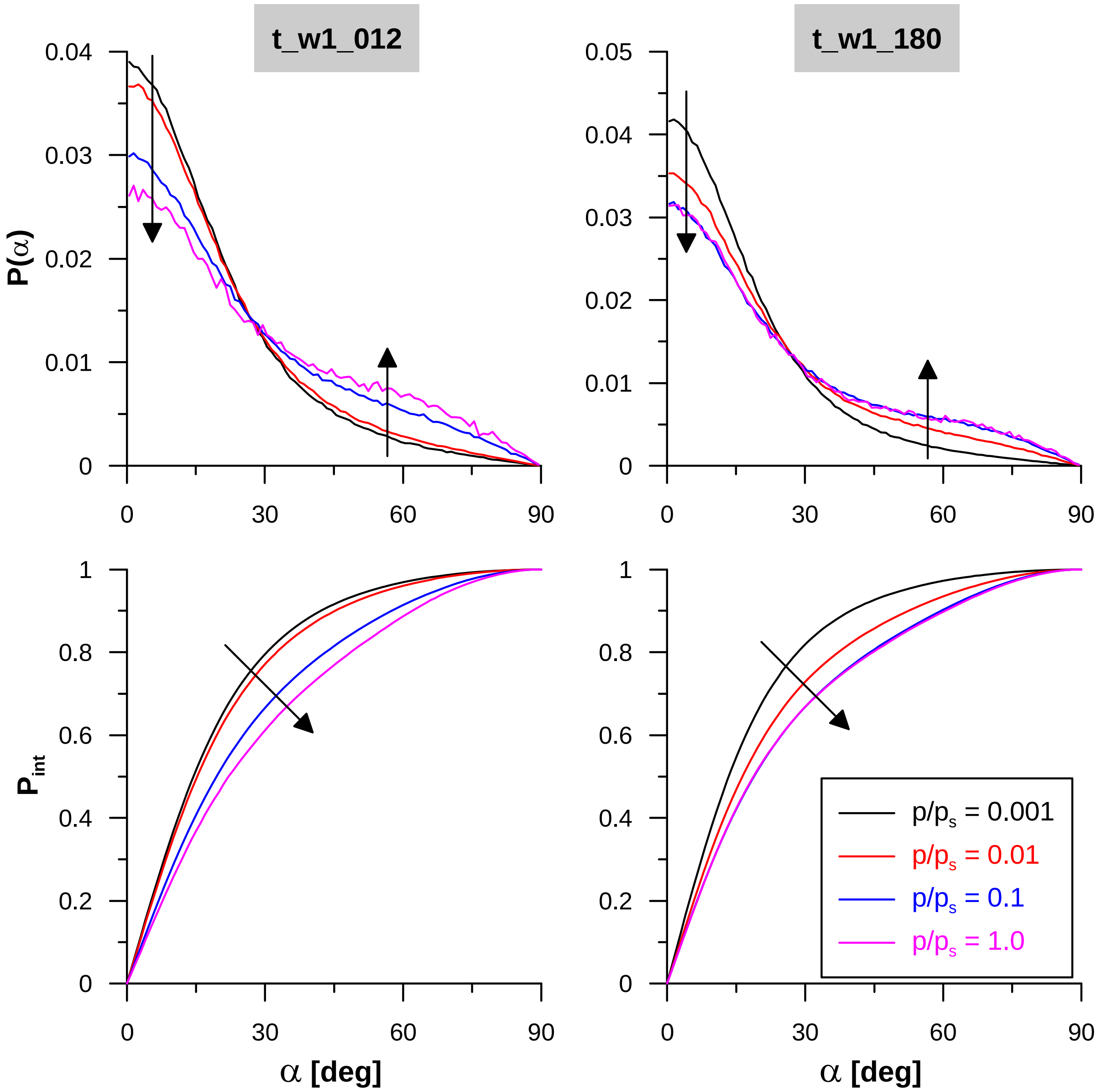

Fig. S4. The changes in angular orientation of nitrogen molecules adsorbed in a monolayer with respect to a tube (for the smallest and largest SWNT). Upper panel shows the histogram of angular orientation with respect to the plane perpendicular to the lengthening of the tube radius passing by a mass centre of a molecule. Bottom panel shows integral curves where $P_{\text{int}}(\alpha) = \sum_{\beta \le \alpha} P(\beta)$. Arrow shows the pressure rise.

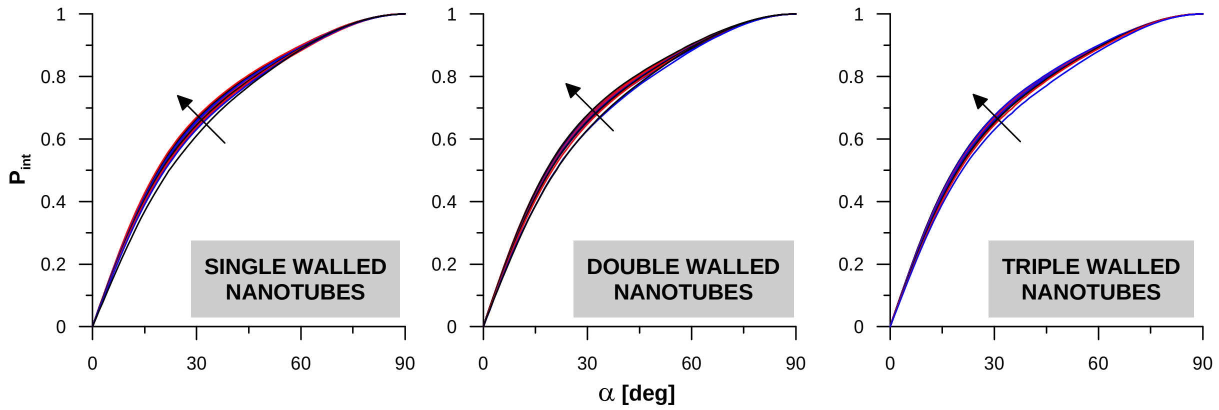

Fig. S5. The comparison of integral curves of angular distributions for nitrogen adsorbed in a monolayer for $p/p_s = 1.0$ for all studied systems. Arrow shows the rise in tube diameter.

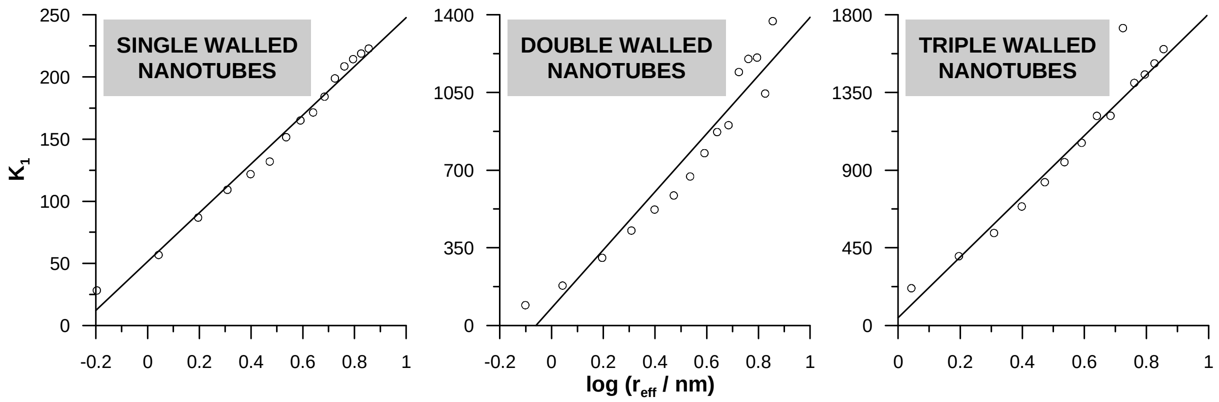

Fig. S6. The correlation between K_1 and the tube size.

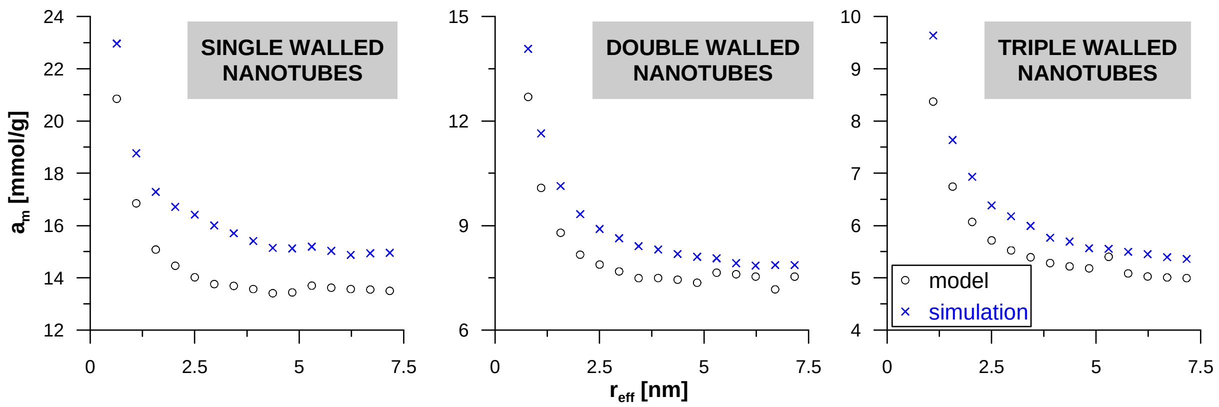

Fig. S7. The comparison of the values of monolayer capacity obtained from the description of simulation data by the new model (Eqs. (7) and (10)) with the average number of molecules in monolayer calculated from simulations at $p/p_s = 1$.