Electronic Supplementary Information

Volume changes of proteins adsorbed at silica particles

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Background subtraction
Background spectra have been subtracted from sample spectra in order to remove Raman scattering of water and light scattering of silica particles (Fig. 1ESI). Background spectra were obtained in the absence of SNase under otherwise identical conditions. After background subtraction, the data are normalized and smoothed (e.g., Fig. 3a of the manuscript). Fluorescence intensities at 380 nm are then used for thermodynamic analysis, where the scattering background is very small.

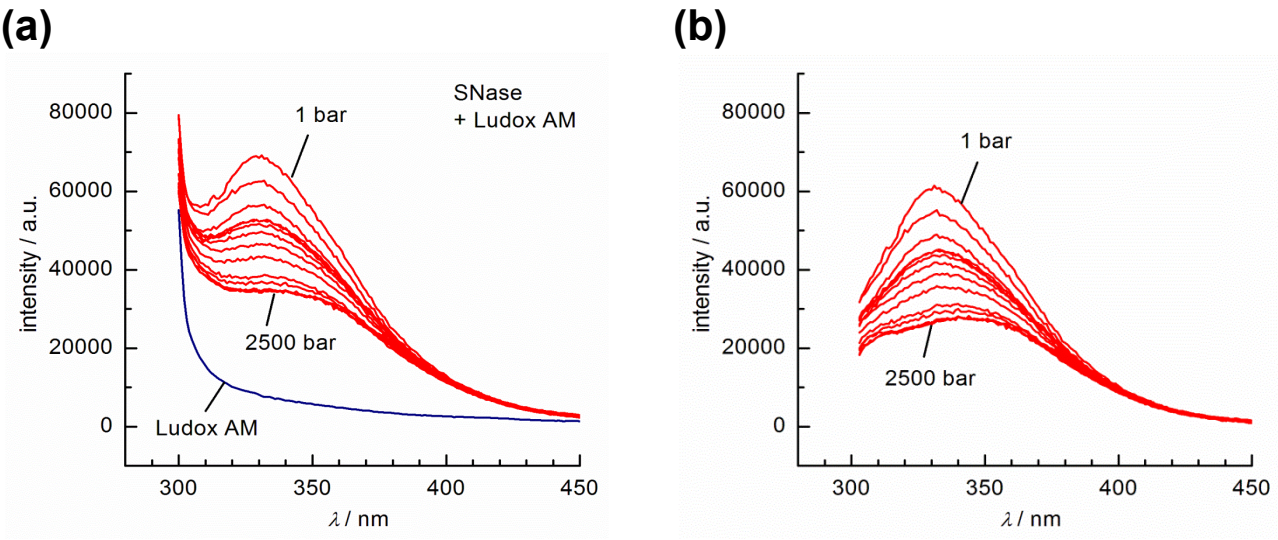

Fig. 1ESI (a) Raw spectra of SNase adsorbed at silica particles (Ludox AM). The background spectrum of the silica particles (Ludox AM) is included in the diagram. (b) Fluorescence spectra of SNase adsorbed at silica particles (Ludox AM) after background subtraction.

Pressure effect on free and adsorbed SNase in 8 M urea solution

Control experiments of denatured SNase in 8 M urea solutions have been performed (Fig. 2ESI). The data show that there is no pressure-induced red-shift of the fluorescence band of free or adsorbed SNase under this condition. Thus, no volume change can be detected anymore, when free or adsorbed SNase is denatured.

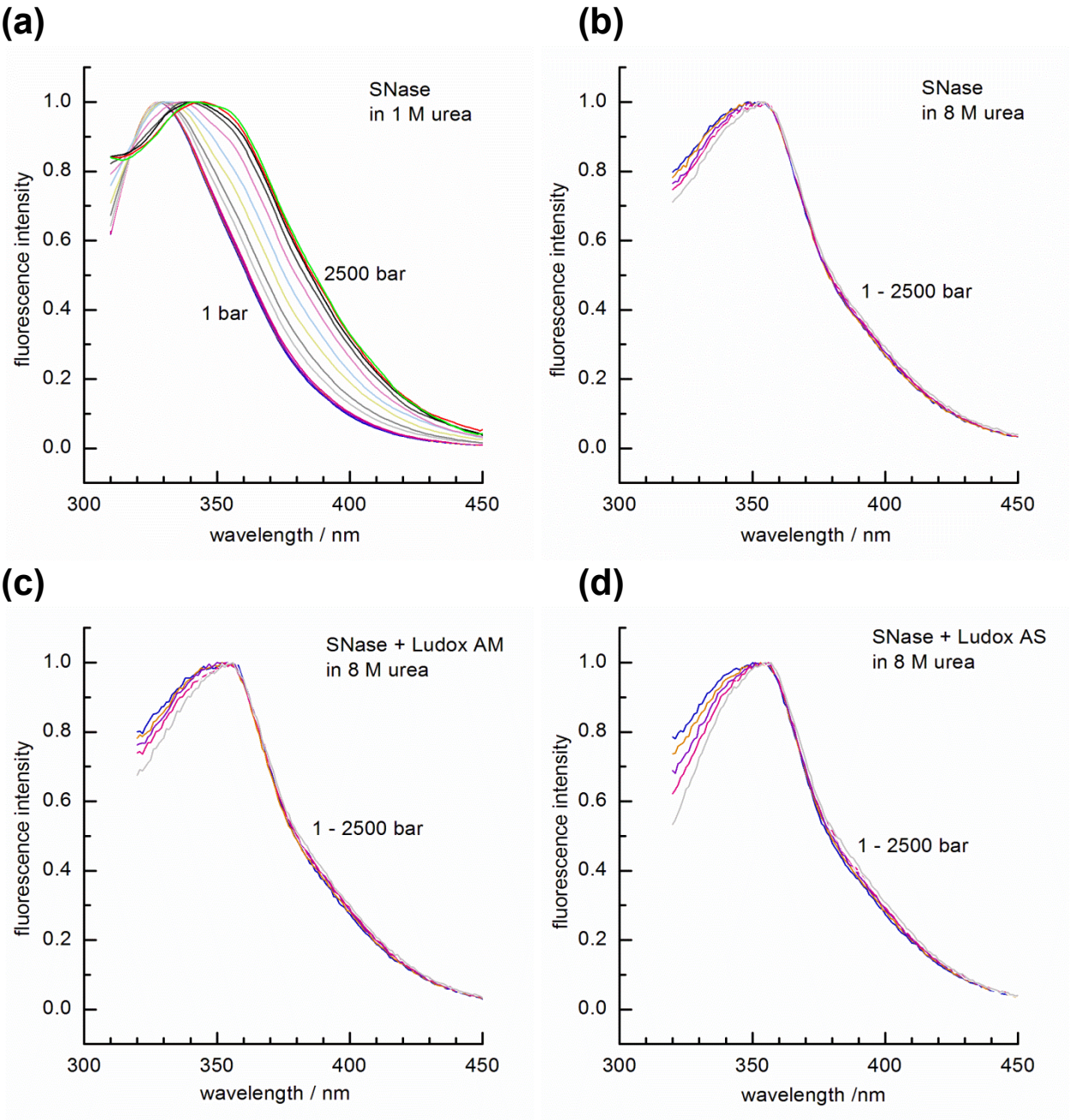

Fig. 2ESI Normalized fluorescence spectra of (a) free SNase in 1 M urea solution, (b) free SNase in 8 M urea solution, (c) adsorbed SNase on Ludox AM in 8 M urea solution, and (d) adsorbed SNase on Ludox AS in 8 M urea solution. In contrast to the 1 M urea solution, no significant pressure effect can be observed, when SNase is denatured in 8 M urea solution.