Supporting information for

Effects of nanobubbles on methane hydrate dissociation: A molecular simulation study

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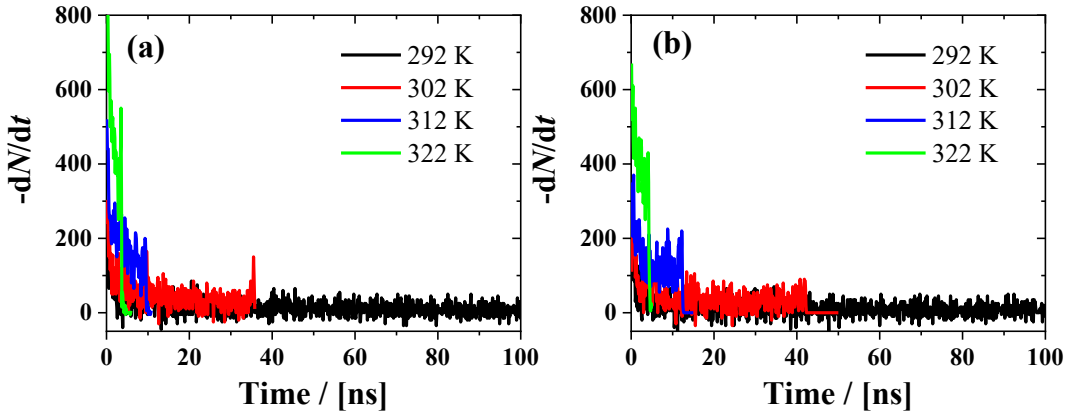

Figure S1. Dissociation rate of the hydrate calculated by the negative derivative of the number of methane molecules in the hydrate phase for HW-nl-L and HW systems.

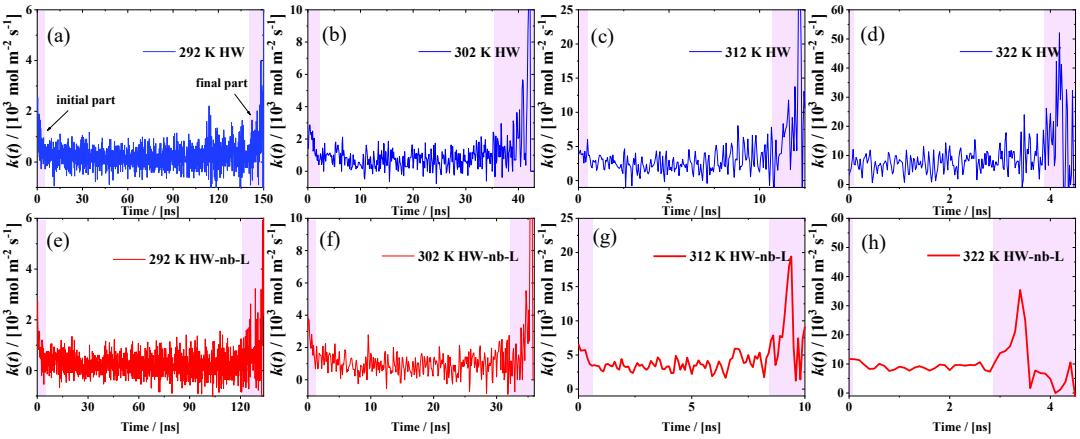

Figure S2. Dissociation rates of the per hydrate surface area in HW and HW-nb-L systems at 292 K (a and e), 302 K (b and f), 312 K (c and g), and 322 K (d and h) as a function of time. The initial and final hydrate dissociation parts in the HW system are indicated by light red rectangle at a temperature of 292 K.

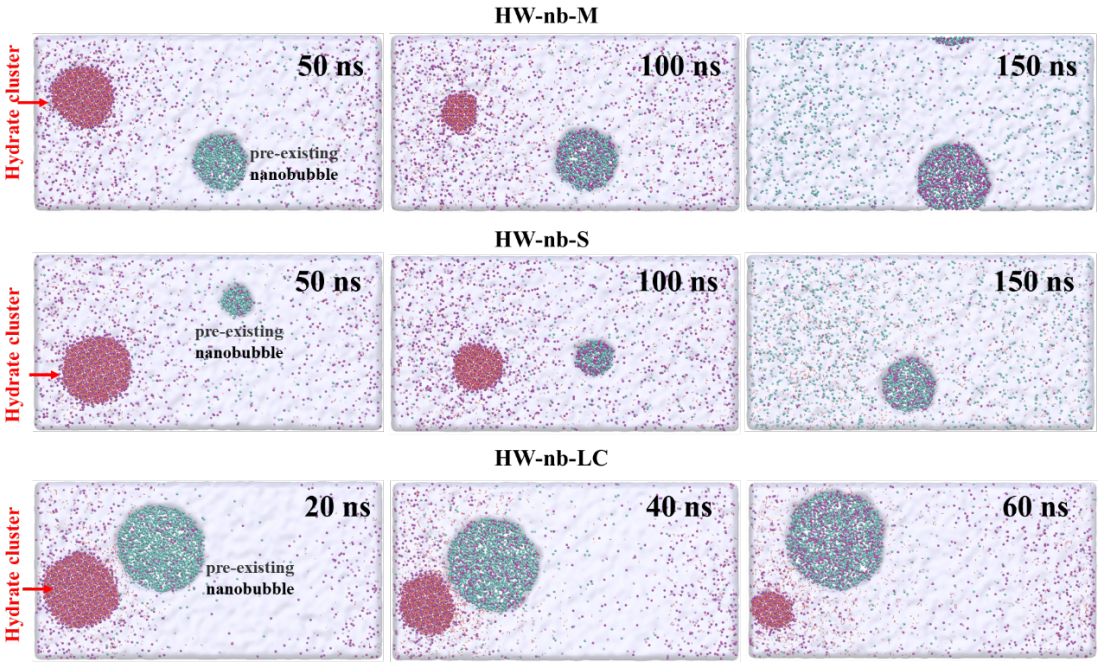

Figure S3. Simulation snapshots of the hydrate dissociation process for the HW-nb-M, HW-nb-S and HW-nb-LC systems at 292 K. The color scheme is the same as in Figure 4 of the main tex.

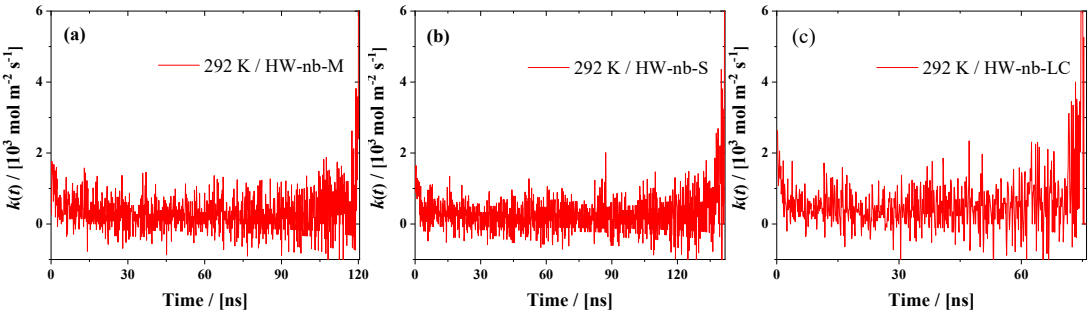

Figure S4. Dissociation rates of the hydrate as a function of time for (a) HW-nb-M, (b) HW-nb-S and (c) HW-nb-LC systems with a pre-existing nanobubble at 292 K.