Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information

Comparison of diamond nanoparticles captured on the floating and grounded membranes in the hot filament chemical vapor deposition process

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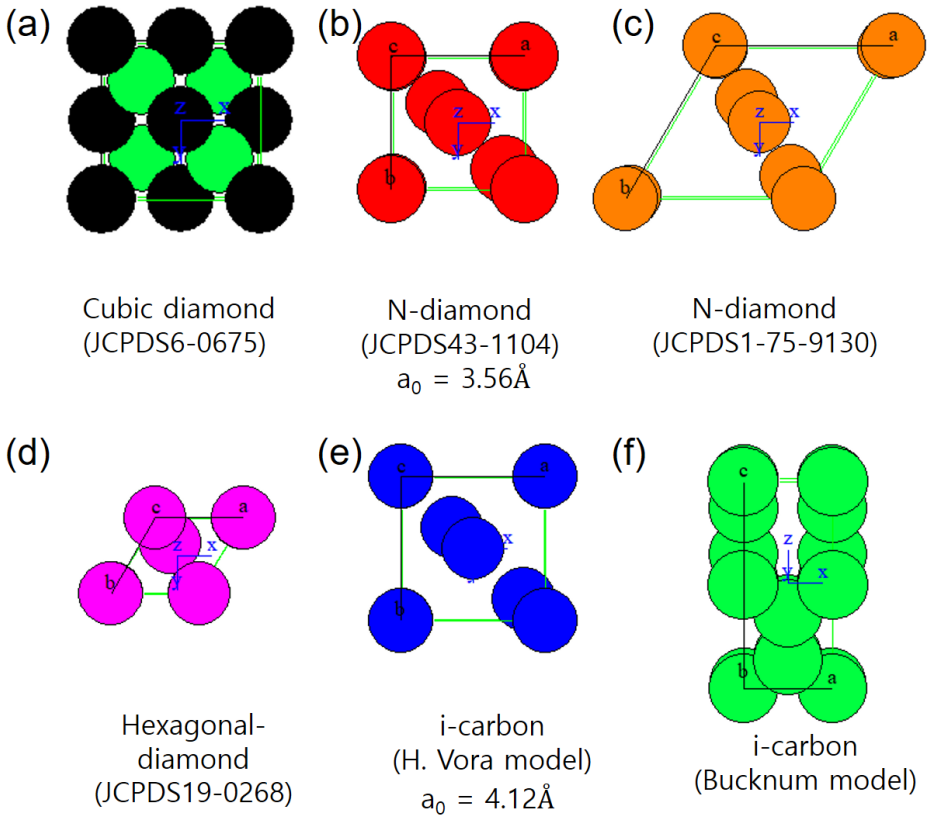


Fig. S1 The structures of the unit cell for various diamond-allotropes determined from experimental XRD data. Unit cells were simulated by CarIne Crystallography 3.1 program. (a) Unit cell of cubic diamond. (b) n-diamond in the cubic structure representation (*Fd*$\bar{3}$*m*). (c) n-diamond in rhombohedral representation. (d) hexagonal diamond known as lonsdaleite structure (*P63/mmc*). (e) i-carbon structure in cubic phase structure (*Fd*$\bar{3}$*m*) with lattice parameter a_0 = 4.12 Å.[1] (f) i-carbon known as glitter structure. The lattice lies in the tetragonal space group $P4_2/mmc$ with lattice parameter a_0 = 2.564 Å and c_0 = 5.928 Å.[2]

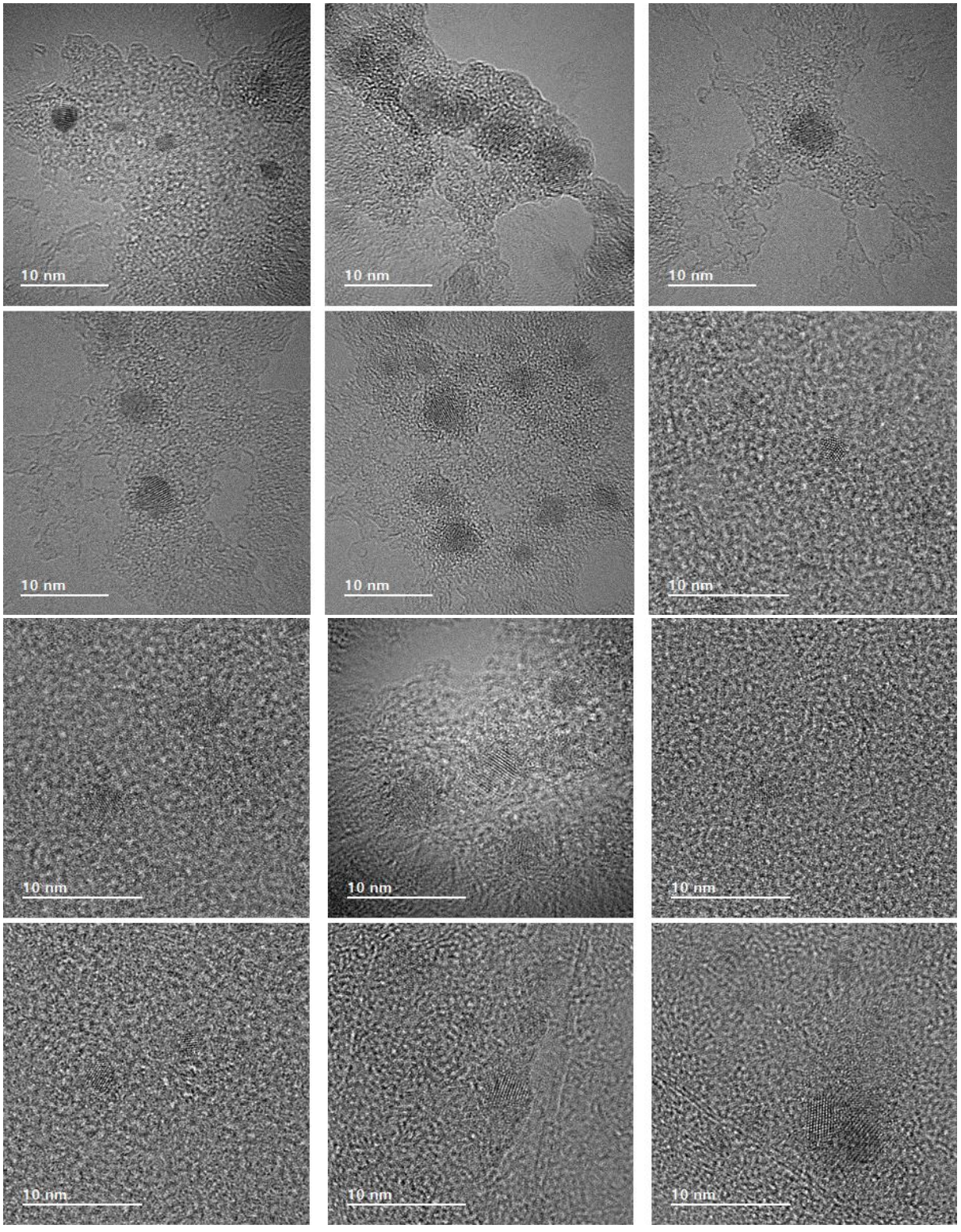
Table-S1 Experimentally observed d-spacings with those reported for cubic diamond, n-diamond, hexagonal diamond, and i-carbon. Observed d-spacing values were approximated within a 3 % error range.

Cubic-diamond (observed)		Cubic diamond (JCPDS6-0675)		n-Diamond (observed)		n-Diamond (JCPDS43-1104)		Hexagonal diamond (observed)		Hexagonal diamond (JCPDS19-0268)		i-Carbon (observed)		i-Carbon (H.Vora model[1])	
d (Å)	*hkl*	d (Å)	*hkl*	d (Å)	*hkl*	d (Å)	*hkl*	d (Å)	*hkl*	d (Å)	*hkl*	d (Å)	*hkl*	d (Å)	*hkl*
								2.18	100	2.19	100	2.45	111	2.46	111
2.06	111	2.06	111	2.06	110	2.06	111	2.06	002	2.06	002	2.11	200*	2.12	200*
								1.92	101	1.92	101				
				1.77	200*	1.78	200*					1.73	211	1.74	211
								1.49	102	1.50	102	1.51	220	1.50	220
1.26	220	1.26	220	1.26	220	1.26	220	1.26	110	1.26	110			1.28	311
										1.17	103				
		1.07	311			1.07	311			1.07	112				

*Forbidden reflections in $Fd\bar{3}m$

Reference

1. H. Vora and T. J. Moravec, *J. Appl. Phys.*, 1981, 52, 6151–6157.
2. M. J. Bucknum, C. J. Pickard, I. Stamatin and E. A. Castro, *J. Theor. Comput. Chem*., 2006, 5, 175–185.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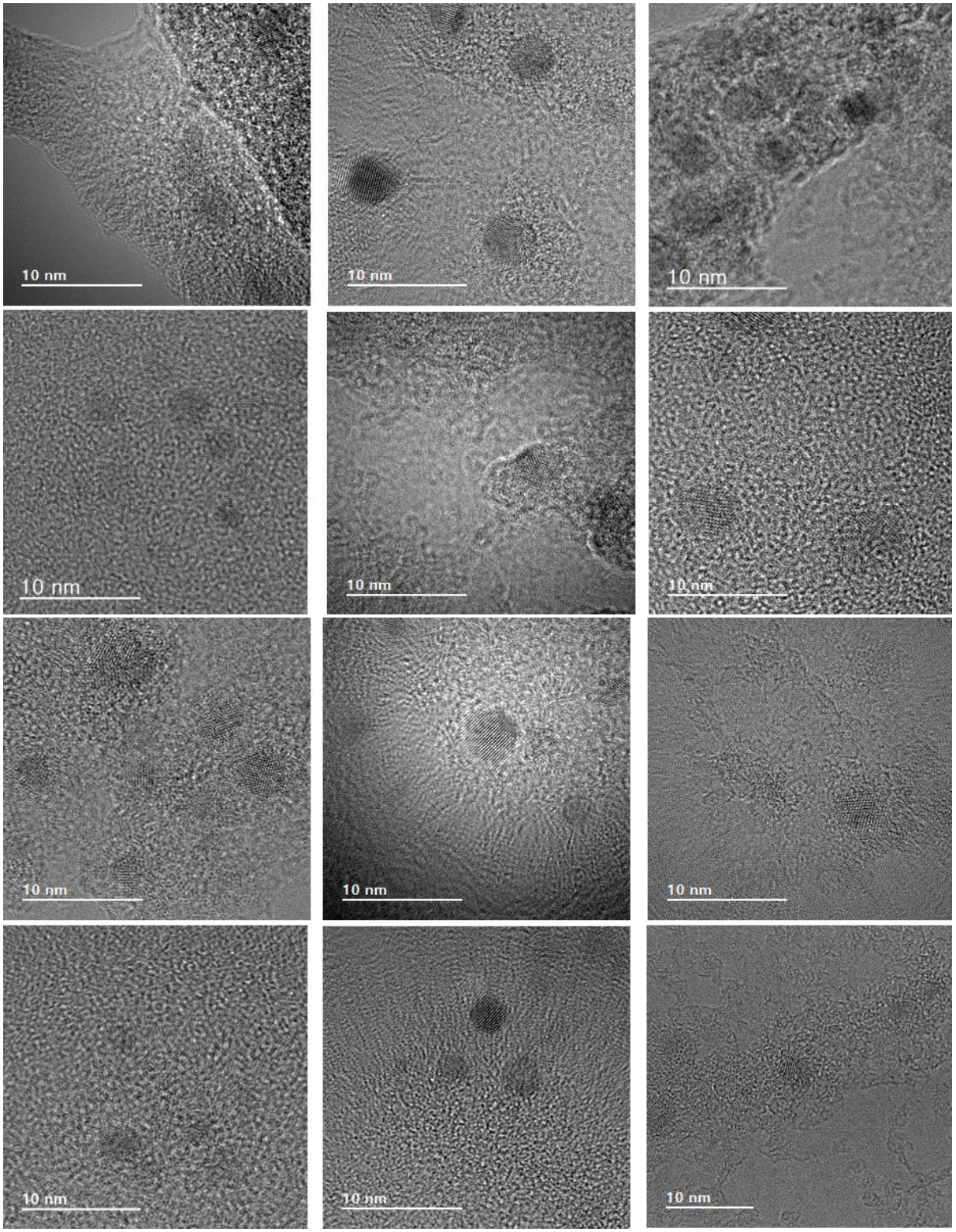

*Supplementary data. HR-TEM images of observed nanoparticles. We analyzed 150 d-spacing values of ~100 nanoparticles at each experimental condition. In addition to those, we also analyzed additional nanoparticles to improve the reproducibility and reliability.