

Novel Self-forming Nanosized DDS Particles for BNCT: Utilizing A Hydrophobic Boron Cluster and its Molecular Glue Effect

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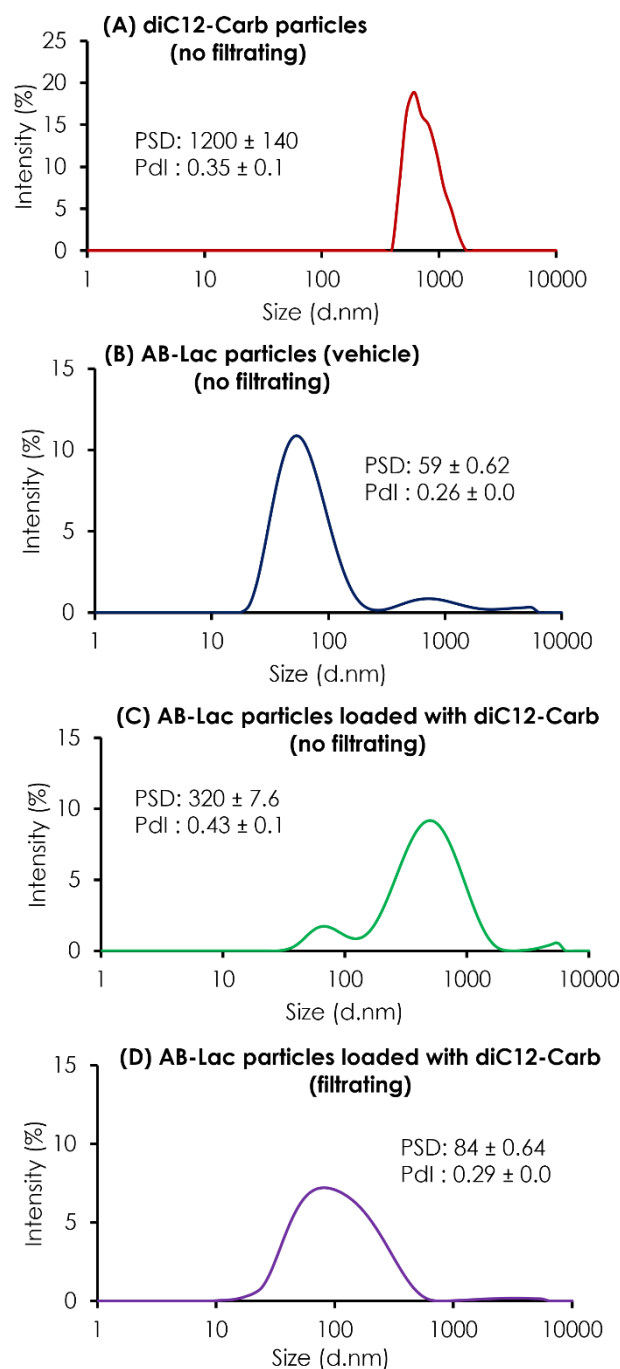


Figure S1. Features of the particles in each preparatory process for the AB-Lac particles loaded with diC12-Carb. Self-formed particles of diC12-Carb (without the AB-Lac polymers), after the passing through PD-10 but no filtrating (A), the AB-Lac particles (vehicle), after the passing through PD-10 but no filtrating (B), and the AB-Lac particles loaded with diC12-Carb, after passing through PD-10 but no filtrating (C), or the AB-Lac particles loaded with diC12-Carb, after the passing through PD-10 and filtrating (D). The filtration was performed after passing through the PD-10 column using 0.2 μm and 0.1 μm filters. The PSD and PDI are represented as mean \pm S.D. ($n=3$). The **panels A-C** revealed a polydisperse pattern after the passing through the PD-10 column but no filtrating, large sized particles (aggregates) remained. Moreover, the data (**panel A**) also revealed that diC12-carb may form larger particles (aggregates) by themselves so that only a small amount of B was incorporated in the AB-Lac particles.

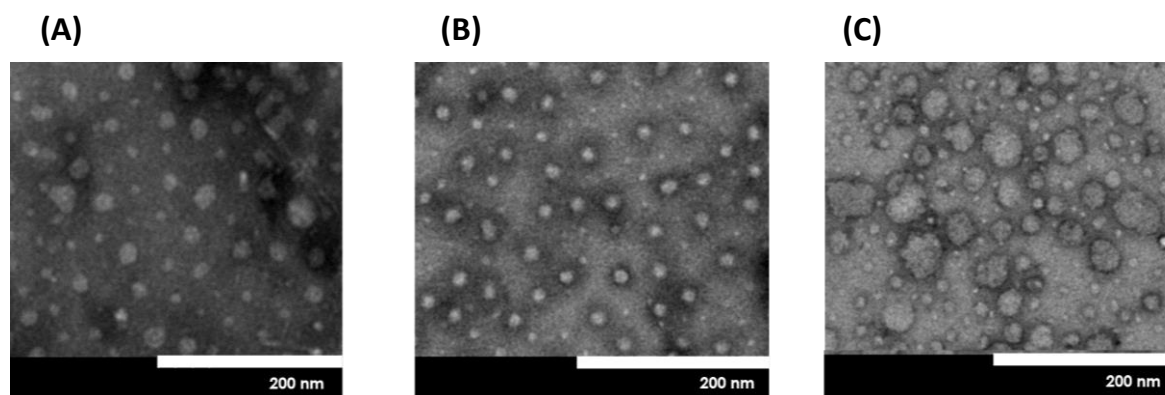


Figure S2. Transmission electron microscopy (TEM) images of the B compound-loaded AB-Lac particles. The AB-Lac particles (vehicle) (A), those loaded with *o*-carborane (B), or with diC6-Carb (C). The TEM images were obtained at an accelerated voltage, 80 kV, and magnification was 10,000x. These images confirmed that the PSD and PdI of the AB-Lac particles (vehicle) were almost like that of the particles loaded with *o*-carborane. The image also revealed that the particles loaded with diC6-Carb (C) were larger than others (A and B).

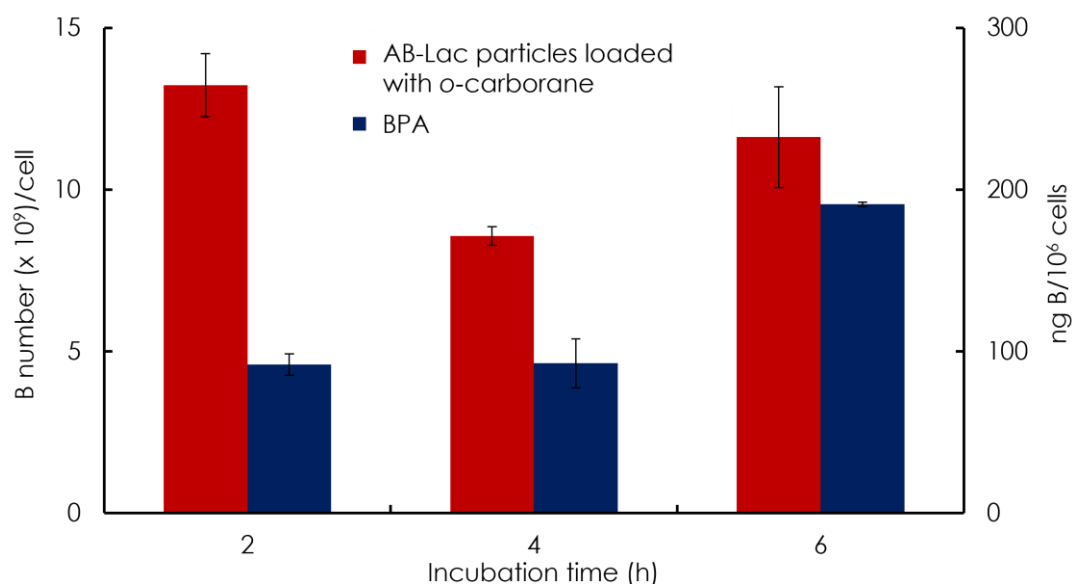


Figure S3. *In vitro* 4T1 cell uptake of B number (amount) by incubating BPA or the AB-Lac particles loaded with *o*-carborane. Time-dependent *in vitro* 4T1 cell uptake of B number was detected at 2, 4, and 6 hr, by incubating with BPA or the AB-Lac particles loaded with *o*-carborane (at 2 mM B equivalent). Data are expressed as mean \pm SEM (n=3). Overall, the results showed that cell uptake of B from the AB-Lac particles loaded with *o*-carborane was higher than that of BPA. The AB-Lac particles loaded with *o*-carborane are taken up by any cancer cell lines probably by endocytosis. Conversely, the BPA is actively taken up by their L-amino acid transporter-1 (LAT-1) which is overexpressed in cancer cells.

Table S1. Cytotoxicity of the AB-Lac particles loaded with carborane isomer or *o*-carborane alkylated derivative to the 4T1 cells.

Carborane isomer/ <i>o</i> -carborane derivative	Cell viability (%) at			
	25 ppm	50 ppm	100 ppm	250 ppm
AB-Lac particles loaded with				
<i>o</i> -Carborane	130 ± 17	100 ± 4.6	99 ± 11	99 ± 8.0
<i>m</i> -Carborane	110 ± 14	97 ± 7.3	100 ± 5.1	110 ± 6.9
diC1-Carb	120 ± 7.3	110 ± 11	100 ± 8.9	93 ± 5.7
diC6-Carb	100 ± 3.2	97 ± 3.5	98 ± 2.7	95 ± 15

The cell viability was assayed by the CCK-8 kit, according to the kit's instructions. Data are expressed as mean ± SEM (n=4). The results showed no cytotoxicity at lower than 250 ppm.