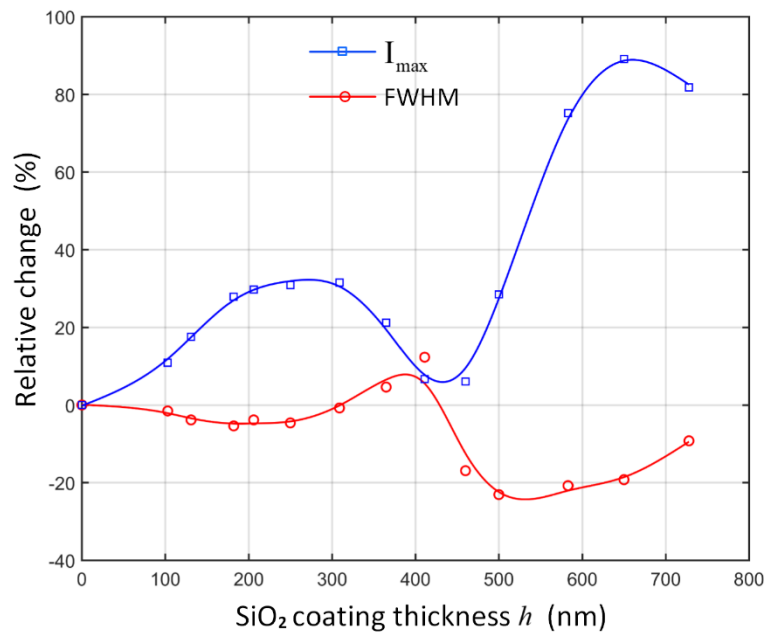


**Figure S1.** Axial (a) and radial (b) trapping efficiency for a coated BTG sphere with a core radius of 2.5 $\mu$ m, as the SiO<sub>2</sub> coating thickness varies.



**Figure S2.** Relative change of the FWHM and maximum optical intensity of PNJs for a 2.5 $\mu$ m-core-radius BTG sphere with different SiO<sub>2</sub> coating thickness.

**Table S1.** Optical trapping efficiency and PNJ property of five different microspheres in water

Microsphere	Optical trapping efficiency		PNJ property	
	$Q_z$	$Q_r$	FWHM (nm)	$I_{\max}(I_0)$
Uncoated PS	0.052	0.442	376	73
Uncoated MF	0.043	0.411	346	109
Uncoated BTG	0.010	0.504	260	165
BTG with 211nm SiO <sub>2</sub> coating	0.085	0.602	248	214
BTG with 583nm SiO <sub>2</sub> coating	0.071	0.488	206	289

\* These microspheres have the same core radius of 2.5 $\mu$ m.