

Supporting Information

Nucleoside-2',3'/3',5'-bis(thio)phosphate antioxidants are also capable of disassembly of amyloid beta₄₂-Zn(II)/Cu(II) aggregates via Zn(II)/Cu(II)-chelation

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Zn(II) equiv	pD
0	7.31
0.05	6.71
0.075	6.70
0.1	6.70
1.1	6.49
2.2	6.39
3.3	6.20
4.4	6.09
5.5	6.00
6.6	5.90
7.7	5.78

Table. S1 pD values of Zn(II) titration of D₂O at RT.

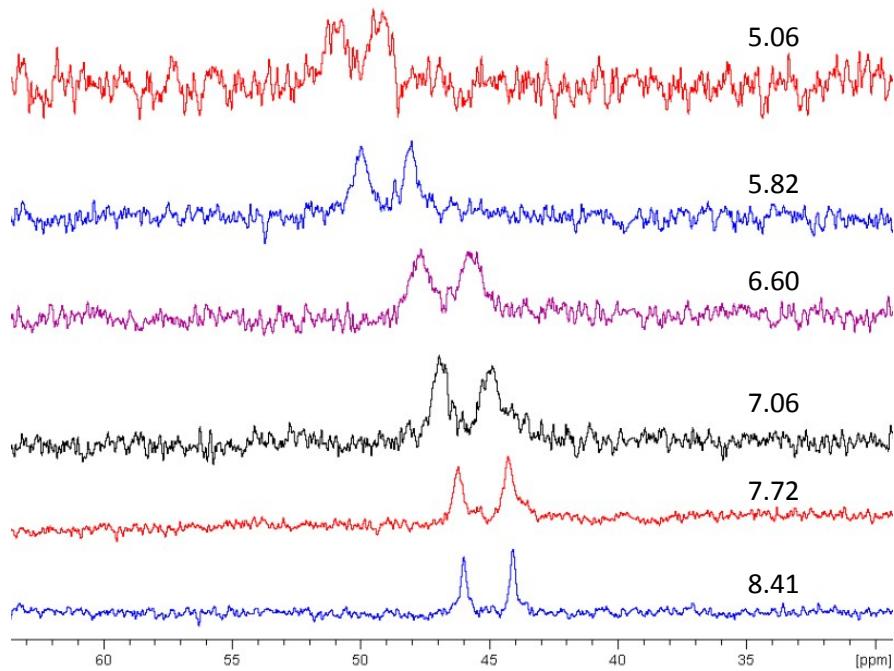


Fig. S2 ^{31}P -NMR spectra of compound 6 at the pD range of 5.1-8.4.

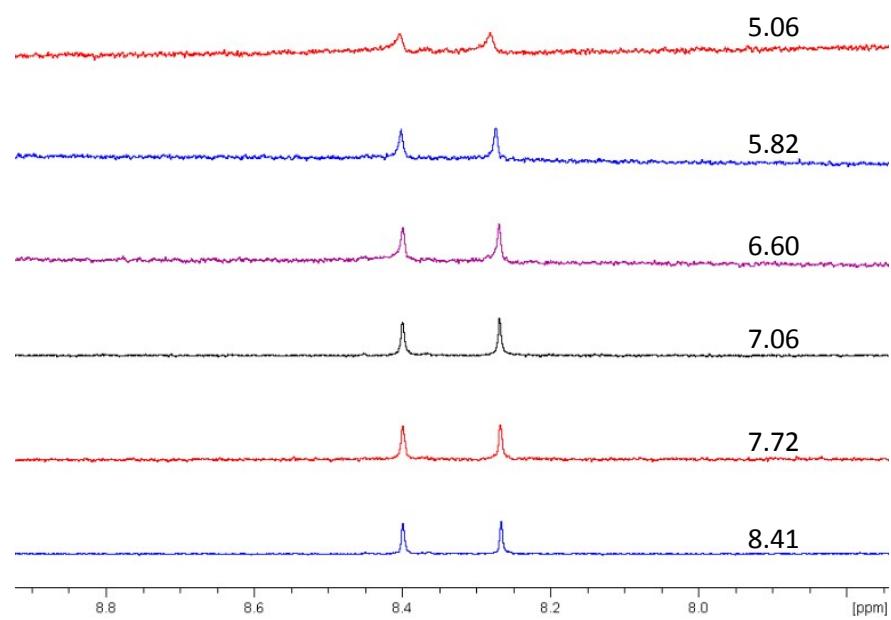


Fig. S3 ^1H -NMR spectra of compound 6 at the pD range of 5.1-8.4.

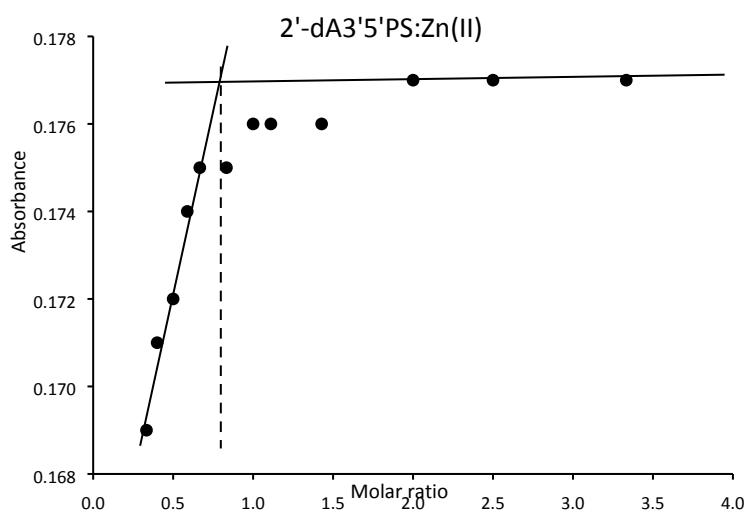


Fig. S4 Titrations of **2** with Zn(II) cross-section of UV-vis spectra at 250 nm.

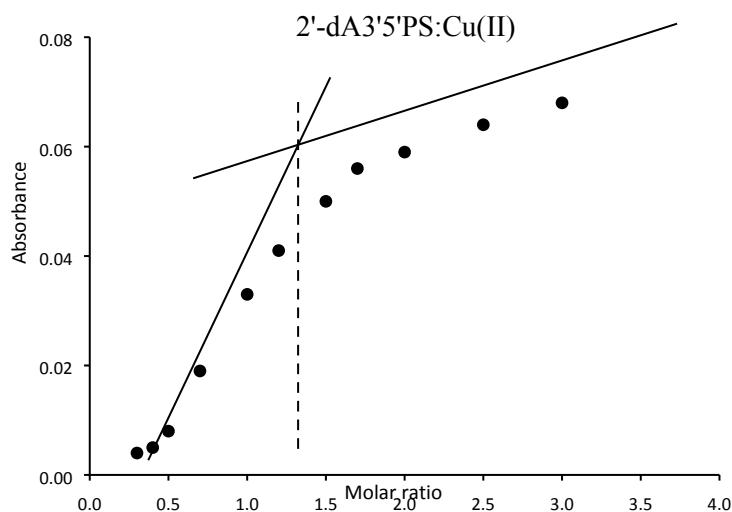


Fig. S5 Titrations of **2** with Cu(II) cross-section of UV-vis spectra at 305 nm.

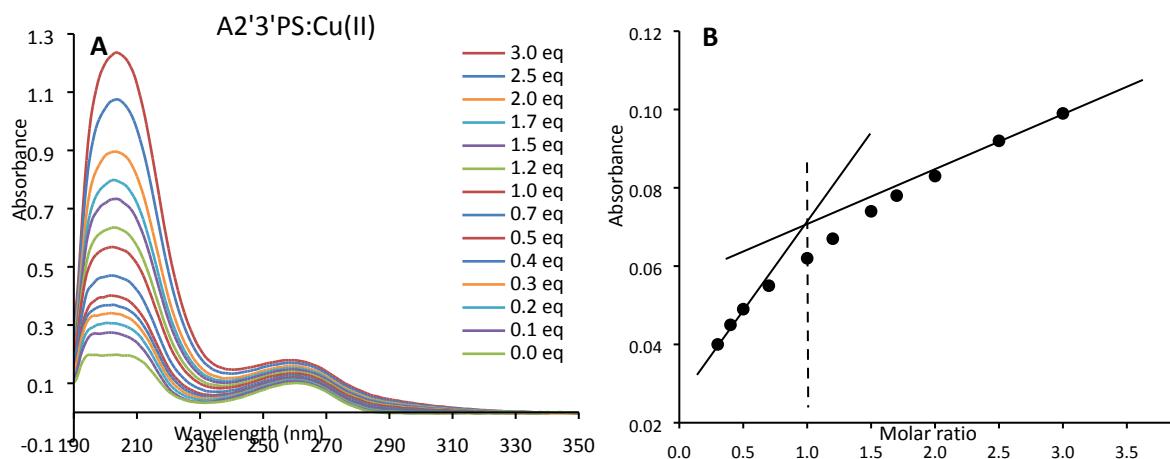


Fig. S6 Titrations of **6** with Cu(II) as monitored by UV-vis spectra. (A) **6**-Cu(II) (B) Cross-section of UV-vis spectra at 276 nm.

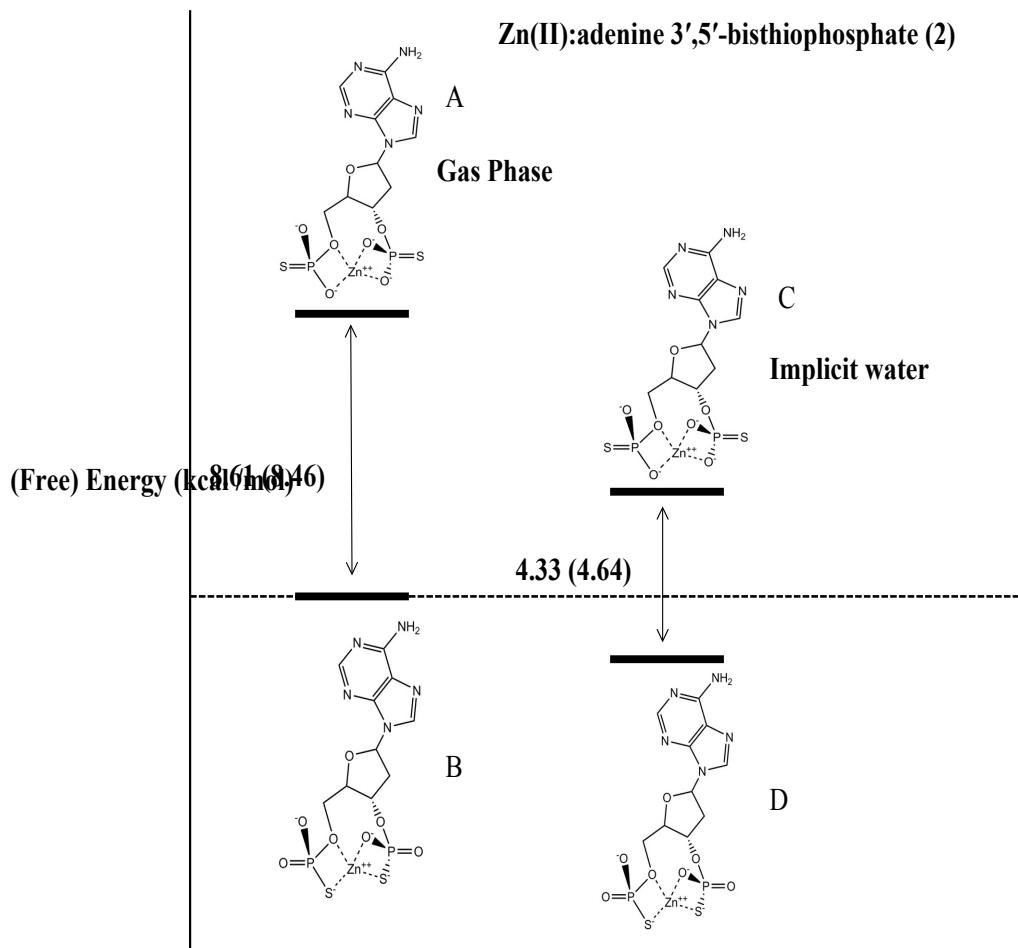


Fig. S7 Relative electronic energies of Zn(II)-**2** complexes in the gas phase (A) Zn(II)-O4 binding mode, (B) Zn(II)-O2S2 binding mode, and in implicit water (C) Zn(II)-O4 binding mode, (D) Zn(II)-O2S2 binding mode. Relative free energies (ΔG) are given in the brackets.

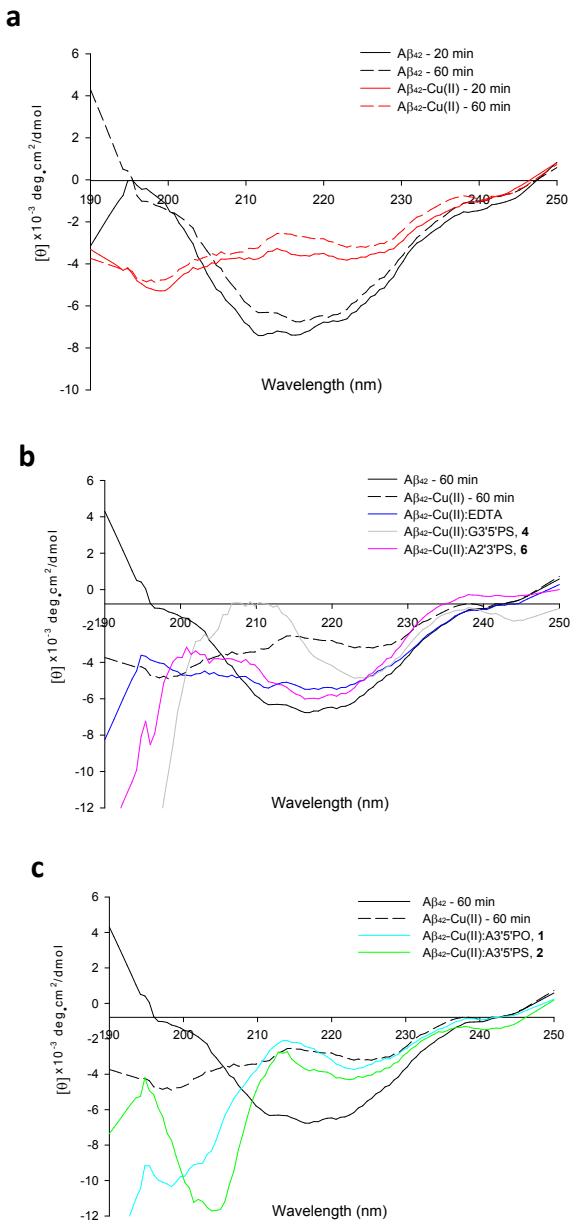


Fig. S8 CD spectra of a) $\text{A}\beta_{42}$ and $\text{A}\beta_{42}\text{-Cu(II)}$ at different incubation time at RT. b,c) $\text{A}\beta_{42}\text{-Cu(II)}$ upon addition of compounds **1**, **2**, **4**, **6**, and EDTA (6 equiv), after 1 h of incubation at RT.

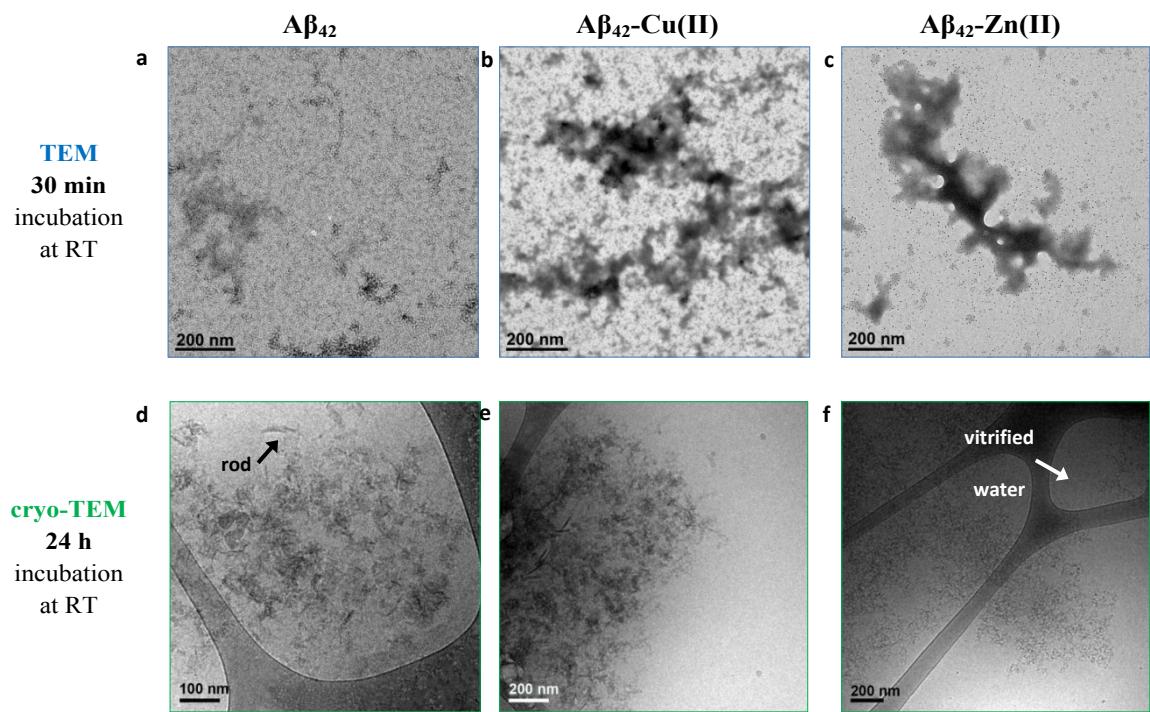


Fig. S9 TEM (a-c) and cryo-TEM (d-f) images of 150 μ M A β ₄₂ and A β ₄₂-M(II) aggregates: (a,d) A β ₄₂; (b,e) A β ₄₂-Cu(II); (c,f) A β ₄₂-Zn(II). Aggregates visualized by TEM and cryo-TEM were incubated for 30 min and 24 h at RT, respectively.

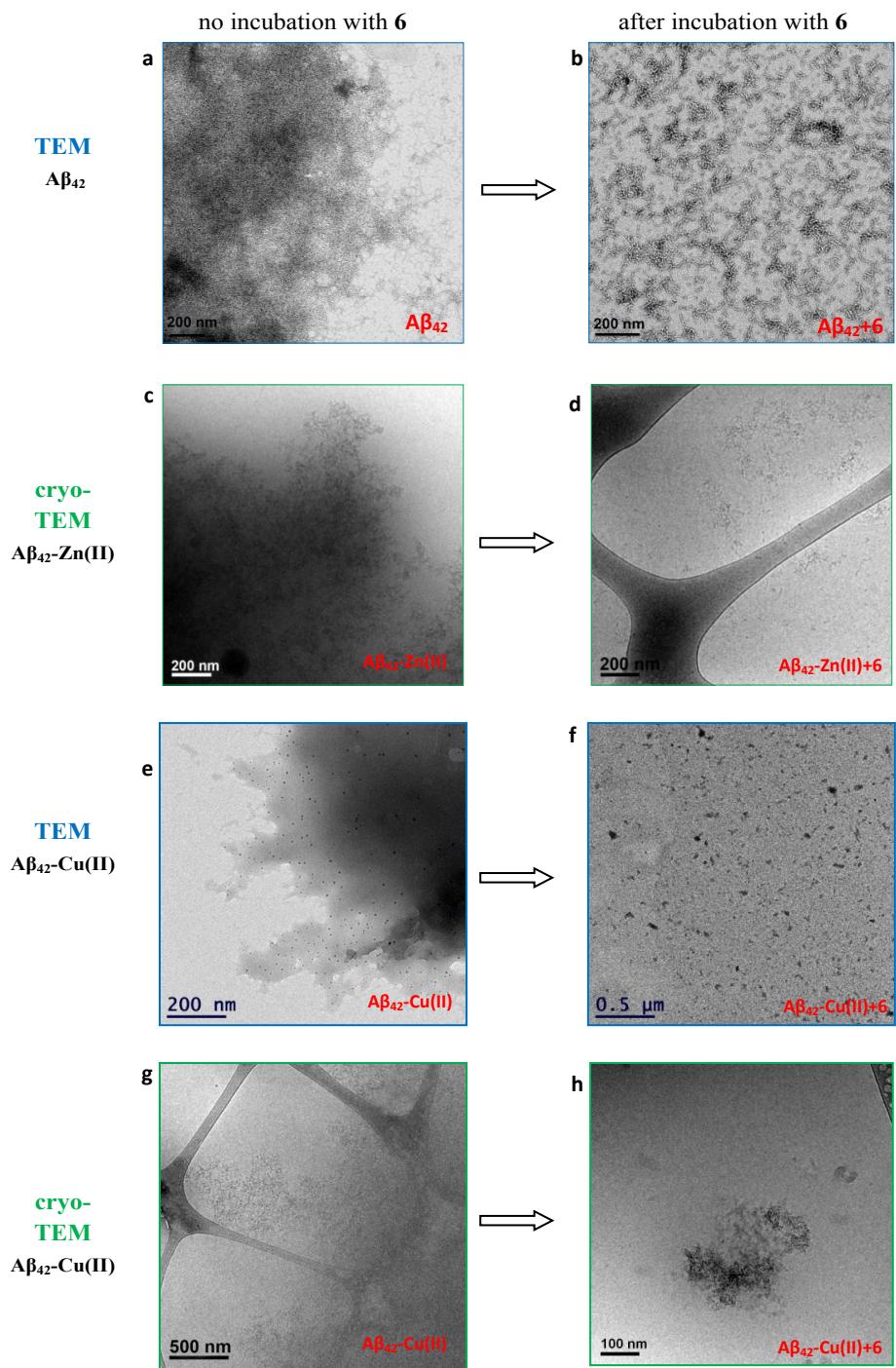


Fig. S10 TEM (a-b,e-f) and cryo-TEM (c-d,g-h) images of 150 μM $\text{A}\beta_{42}$ or $\text{A}\beta_{42}-\text{Zn(II)}/\text{Cu(II)}$ 7 day-old-aggregates in the absence (left) and presence (right) of **6** (at 6 equiv): (a) $\text{A}\beta_{42}$; (b) $\text{A}\beta_{42}+\mathbf{6}$; (c) $\text{A}\beta_{42}-\text{Zn(II)}$; (d) $\text{A}\beta_{42}-\text{Zn(II)}+\mathbf{6}$. (e,g) $\text{A}\beta_{42}-\text{Cu(II)}$; (f,h) $\text{A}\beta_{42}-\text{Cu(II)}+\mathbf{6}$.