Supplementary information

Multiple-decked Gd(III) Complexes Induced by Hydrogen Bonds Depending on Anions

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1. General procedures

Thermal gravimetric analysis was recorded on a Shimadzu TGA-50H in nitrogen atmosphere. Temperature ranges from 25 ºC to 500 ºC and is elevated at 10.0 ºC / min. The arrangement used to measure magnetic susceptibility by using a Quantum Design/MPMS SQUID (superconducting quantum interface device). SQUID data were collected 5 k from 300 K at 5000 G.

2. Single crystal X-ray analysis.

2-1. {[Gd(btp)$(H_2O)_4(NO_3)_2$]·2btp·H_2O·MeOH·NO_3} (**1**)

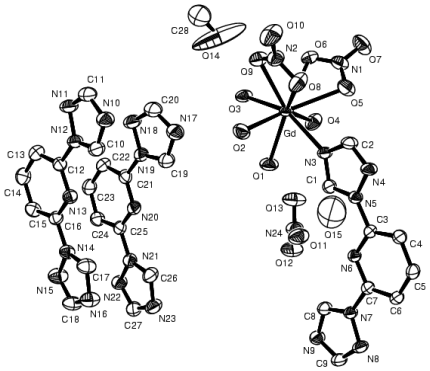

Fig. S1 ORTEP drawing of asymmetric unit of **1.** All the hydrogen atoms are omitted for clarity.

By single X-ray structure analysis represent that the asymmetric unit of complex (**1**) is composed of one Gd ion, five H_2O molecules, one methanol, three nitrate ions and three btp molecules**.** The coordination number of Gd ion is nine in which two nitrate ions chelate Gd in a η^2-mode and four H_2O and N atoms from btp bind directly Gd center. The first shell around Gd is arranged in tricapped-trigonal-prismatic architecture.

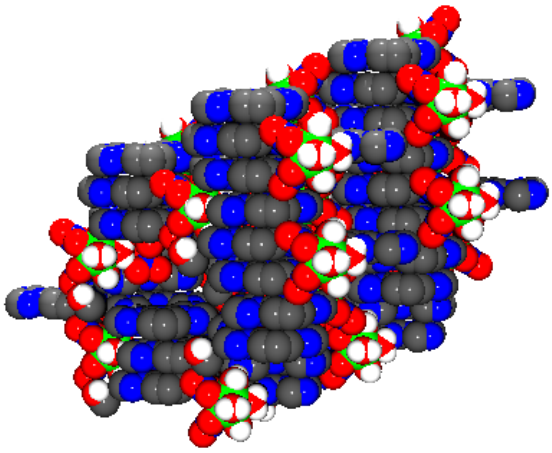

Fig. S2. Space filling diagram presenting π-π stacking pattern of dimeric **1**.

2-2. {[Gd(btp)$(H_2O)_3$(MeOH)$(NO_3)_2$]·2btp·MeOH·ClO_4} (**2**)

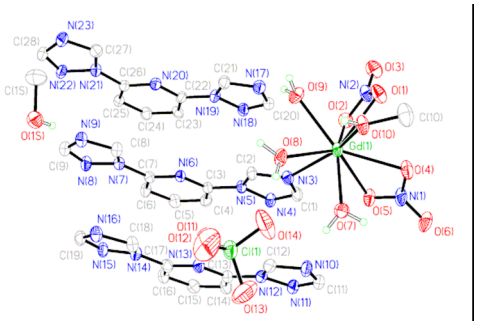

Fig. S3. ORTEP drawing of asymmetric unit of **2.**

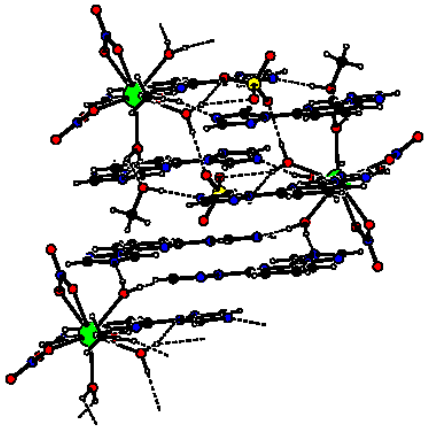

Fig. S4 Hydrogen bond patterns propagating in 1dimensional direction.

3. Magnetic susceptibility study

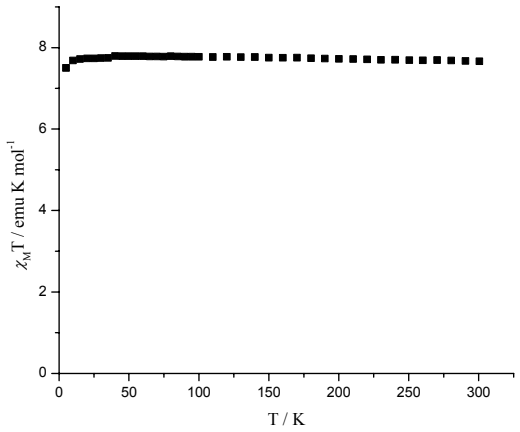

Fig. S5. $X_M T$ *vs* T curve for **1**

The variable-temperature magnetic susceptibility of **1** in the range 5-300 K reveal that there is no magnetic interaction between Gd(III) centres. The $X_M T$ of 7.83~7.89 emu K mol^{-1} per Gd(III) of **1** is, within error, identical to the spin-only value of 7.88 emu K mol^{-1}. These data are in agreement with the large separation distances between the neighboring magnetic centres (10.66 Å).