

Figure S1.  $^1\text{H}$  NMR spectrum of  $\beta$ -CD-SH.

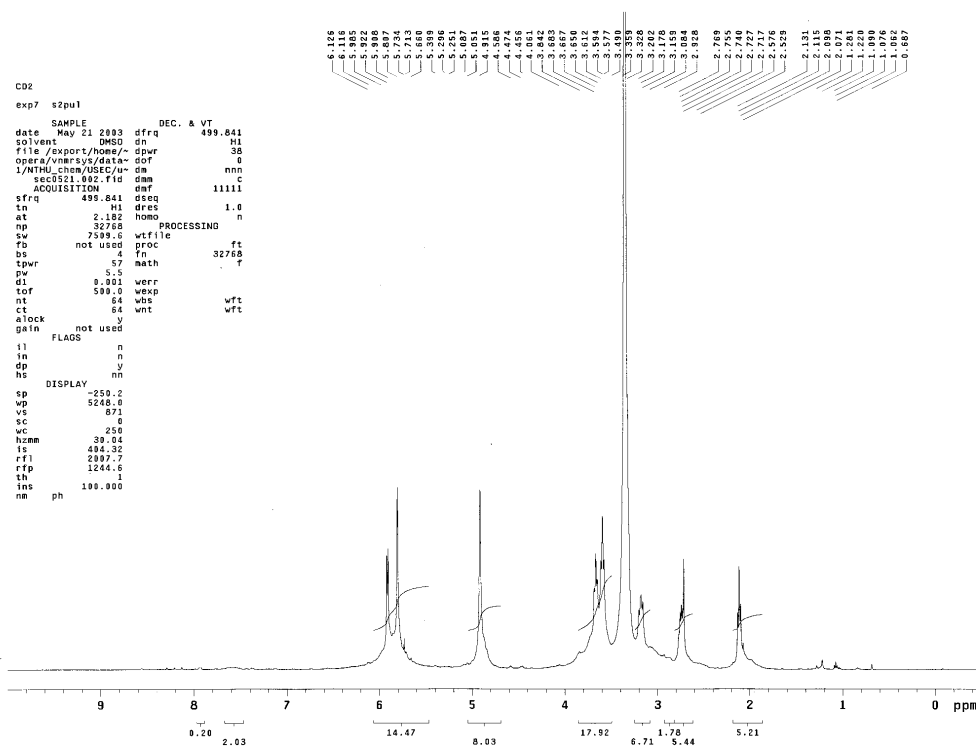


Figure S2.  $^1\text{H}$  NMR spectrum of 11-MUAM.

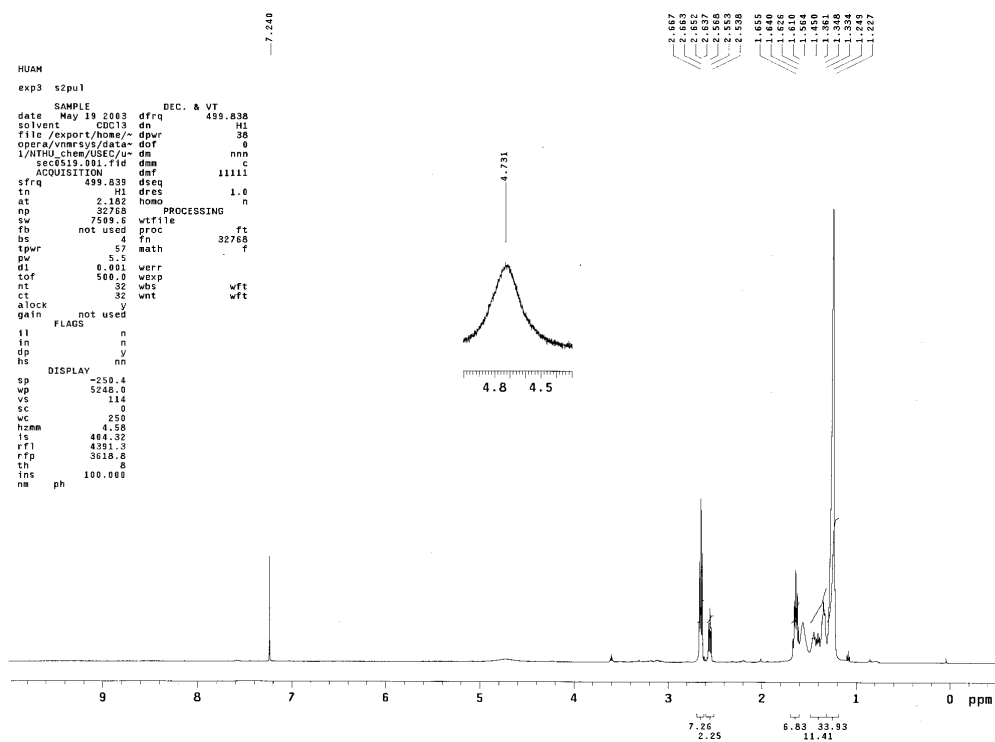


Figure S3. Photographs of 15-crown-5-SH functionalized gold sols (A) before and (B) after addition of 25  $\mu\text{L}$   $\text{K}^+$  (10 mM). The fact that 15-crown-5-S-functionalized gold sol is responsive to  $\text{K}^+$  recognition demonstrates the applicability of this two-step method.

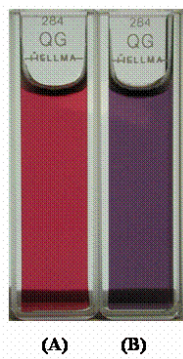


Figure S4. Photographs of 11-MUAM functionalized gold sols before (left) and after (right) addition of one drop of 20 % glutaraldehyde solution which is a cross-linker between amino groups. The aggregation and precipitates shown in the right demonstrate the successful functionalization of 11-MUAM on gold nanoparticle.

