

#ESI (Electronic Supplementary Information)

Remarkably stable gold nanoparticles functionalized with zwitterionic liquid based on imidazolium-sulfonate in high concentration of aqueous electrolyte and ionic liquid

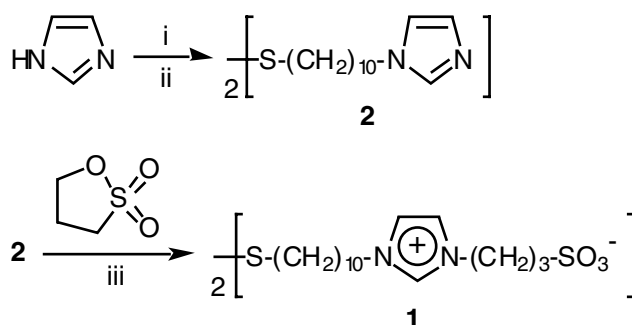
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A new disulfide **1** was synthesized by general methods as illustrated in Scheme 1. Imidazole was treated with sodium hydride in THF to form the anion which was reacted with Br-(CH₂)₁₀-S-S-(CH₂)₁₀-Br to yield **2**. Zwitter-disulfide **1** was prepared in 88% yield by reaction of **2** with 1,3-propanesultone in acetone at room temperature for 5 days. **1**: FT-IR 1652 cm⁻¹ (C=C), 1190 and 1043 cm⁻¹ (SO₂); ¹H NMR (DMSO-*d*₆) δ 9.19 (s, 2H, NCHN), 7.80-7.76 (m, 4H, NCHCHN), 4.30 (t, 4H, *J* = 7 Hz, NCH₂), 4.14 (t, 4H, *J* = 7 Hz, NCH₂), 2.67 (t, 4H, *J* = 7 Hz, CH₂SO₃), 2.41 (t, 4H, *J* = 7 Hz, CH₂S), 2.09 (q, 4H, *J* = 7 Hz, CH₂), 1.77 (q, 4H, *J* = 7 Hz, CH₂), 1.58 (q, 4H, *J* = 7 Hz, CH₂) and 1.34-1.23 (m, 24H, CH₂); ¹³C NMR (DMSO-*d*₆) δ 136.0, 122.3, 122.2, 48.7, 47.8, 47.3, 37.8, 29.3, 28.8, 28.7, 28.5, 28.3, 27.7, 26.2, 25.5. MS (FAB), *m/z* 723 (MH⁺).



Scheme 1. i, NaH, THF, room temp., 1 h; ii, Br-(CH₂)₁₀-S-S-(CH₂)₁₀-Br; iii, acetone, room temp.