

## Supplementary

**Table S1.** pH-metric titration data of 2-mercaptoimidazole and calculated pKa valued of 2-mercaptoimidazole in the H<sub>2</sub>O-DMSO solvent at  $\chi_{\text{DMSO}} = 0.1$  mol. fraction,  $C_{\text{2MI}} = 0.01 \text{ mol L}^{-1}$ .

V (0.01N, HCl), ml	pH	[HL] <sup>+</sup> · 10 <sup>4</sup> , mol L <sup>-1</sup>	[L] · 10 <sup>3</sup> , mol L <sup>-1</sup>	pKa
0	5.82	0	10	
0.05	3.58	2.00	9.98	1.890
0.1	3.22	3.98	9.96	1.840
0.15	3.02	6.01	9.94	1.825
0.2	2.88	7.90	9.92	1.819
0.25	2.78	9.90	9.90	1.826
0.3	2.7	11.86	9.88	1.835
0.35	2.63	13.81	9.86	1.842
0.4	2.56	15.75	9.84	1.840
0.45	2.51	17.67	9.82	1.851
0.5	2.47	19.64	9.80	1.868
0.55	2.43	21.53	9.78	1.880
0.6	2.39	23.40	9.77	1.889
0.65	2.35	25.33	9.75	1.896
0.7	2.32	27.24	9.73	1.910
0.75	2.29	29.13	9.71	1.922
0.8	2.26	31.01	9.69	1.933
0.85	2.23	32.88	9.67	1.942
0.9	2.21	34.75	9.65	1.960
0.95	2.19	36.61	9.63	1.977
1.0	2.17	38.46	9.62	1.994
1.05	2.15	40.31	9.60	2.010
1.1	2.13	42.15	9.58	2.025
1.15	2.11	43.98	9.56	2.040
1.2	2.09	45.80	9.54	2.055
1.25	2.07	47.62	9.52	2.070
1.3	2.06	49.43	9.51	2.095
1.35	2.05	51.23	9.49	2.120
				1.93±0.06

**Table S2.** Potentiometric titration data of AgNO<sub>3</sub> solution by 2MI solution at  $T=298.15\text{K}$ ,  $\chi_{\text{DMSO}}=0.10$  mol. fraction.  $I=0.1\text{ mol L}^{-1}\text{ NaClO}_4$ .

$E, \text{mV}$	$C_{\text{Ag}} \cdot 10^5$ mol L <sup>-1</sup>	$C_{\text{L}} \cdot 10^5$ mol L <sup>-1</sup>	$[\text{Ag}] \cdot 10^{10}$ mol L <sup>-1</sup>	$[\text{L}] \cdot 10^{10}$ mol L <sup>-1</sup>	$\text{AgL}^+ \cdot 10^5$ mol L <sup>-1</sup>	$\text{AgL}_2^+ \cdot 10^7$ mol L <sup>-1</sup>	$\text{AgL}_3^+ \cdot 10^9$ mol L <sup>-1</sup>
514,4	0,200	9,980	798040,13	0,0003874	1,999	0,00139	0,000000100
483,3	0,398	9,960	598110,18	0,0010286	3,979	0,00732	0,000001401
427,1	0,596	9,940	398255,94	0,0023128	5,957	0,0247	0,0000106
399,4	0,794	9,921	198704,84	0,0061722	7,932	0,0876	0,0001006
389,5	0,990	9,901	13304,52	0,113	9,747	1,9760	0,0416
379,3	1,186	9,881	855,582	1,730	9,574	2,965	0,954
364,8	1,381	9,862	425,531	3,376	9,291	5,613	3,525
358,5	1,575	9,843	276,903	5,035	9,017	8,125	7,610
350,8	1,768	9,823	198,991	6,792	8,742	10627	13,427
344,2	1,961	9,804	154,930	8,473	8,491	12,875	20,294
339,3	2,153	9,785	125,502	10,164	8,250	15,006	28,370
334,0	2,344	9,766	104,730	11,853	8,028	17,030	37,548
328,5	2,534	9,747	89,011	13,561	7,807	18,951	47,790
323,0	2,724	9,728	76,861	15,277	7,594	20,762	58,997
318,6	2,913	9,709	67,211	17,000	7,390	22,483	71,097
315,7	3,101	9,690	59,380	18,731	7,194	24,111	84,021
308,9	3,475	9,653	47,760	22,123	6,833	27,051	111,322
304,3	3,846	9,615	39,221	25,617	6,499	29,792	141,963
298,2	4,398	9,560	30,412	30,735	6,045	33,251	190,087
292,3	4,943	9,506	24,413	35,790	5,650	36,192	240,916
286,3	5,482	9,452	19,981	40,912	5,286	38,701	294,498
281,7	6,015	9,398	16,700	45,967	4,966	40,850	349,278
276,6	6,542	9,346	14,181	50,993	4,677	42,680	404,841
273,1	7,063	9,294	12,182	56,002	4,410	44,200	460,393
267,6	7,749	9,225	10,133	62,597	4,101	45,941	534,923
262,8	8,425	9,158	8,554	69,143	3,822	47,290	608,284
258,4	9,091	9,091	7,312	75,622	3,574	48,362	680,290
254,3	9,910	9,009	6,113	83,612	3,302	49,403	768,336
249,0	10,873	8,913	5,014	93,061	3,017	50,241	869,650
243,7	11,817	8,818	4,192	102,333	2,774	50,790	966,885
239,6	12,740	8,726	3,551	111,442	2,562	51,090	1059,105
234,3	13,793	8,621	2,980	121,877	2,345	51,154	1159,635
232,0	14,821	8,518	2,533	132,077	2,160	51,061	1254,344
228,3	15,966	8,403	2,134	143,485	1,975	50,712	1353,570
223,0	14,219	8,278	1,780	155,968	1,800	50,233	1457,297
217,8	18,434	8,157	1,521	168,117	1,649	49,604	1551,146
213,8	19,614	8,039	1,304	179,943	1,518	48,870	1635,696
210,4	20,886	7,911	1,111	192,712	1,391	47,991	1720,120

206,5	22,118	7,788	0,967	205,090	1,283	47,100	1796,812
202,0	23,896	7,610	0,794	222,995	1,145	45,702	1895,434
198,6	25,595	7,440	0,664	240,125	1,031	44,301	1978,822
193,6	27,746	7,225	0,536	261,833	0,907	42,521	2070,813
189,0	29,775	7,022	0,441	282,379	0,806	40,744	2139,888
184,3	31,694	6,831	0,371	301,809	0,724	39,112	2195,407
180,3	34,383	6,562	0, 294	329,084	0,625	36,810	2253,517
176,0	36,869	6,313	0,239	354,326	0,548	34,730	2289,124