

Supplementary Materials

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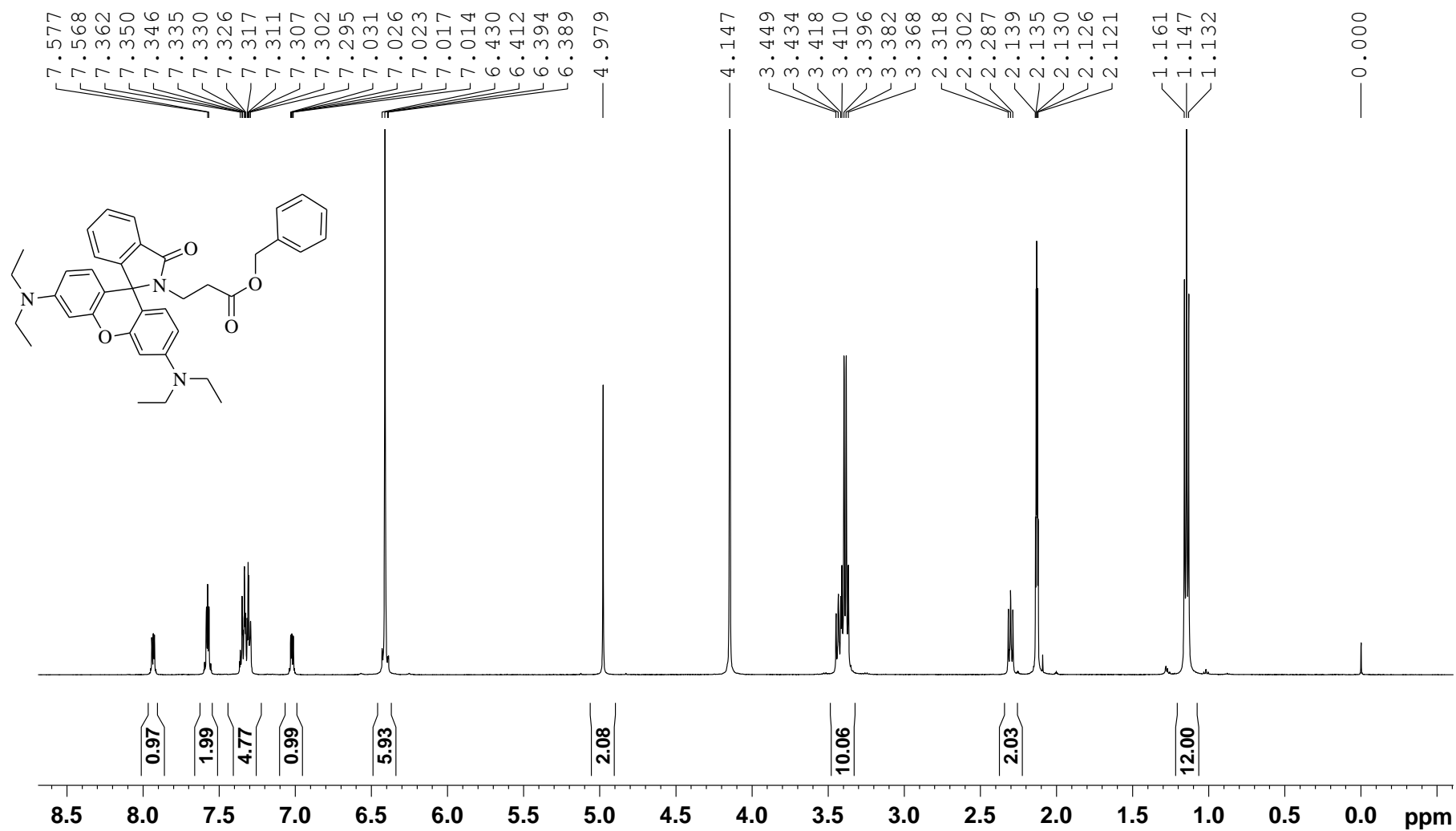
Figure S1. ^1H -NMR of **RBAP** in acetone- d_6 : D_2O (5:1, v/v).

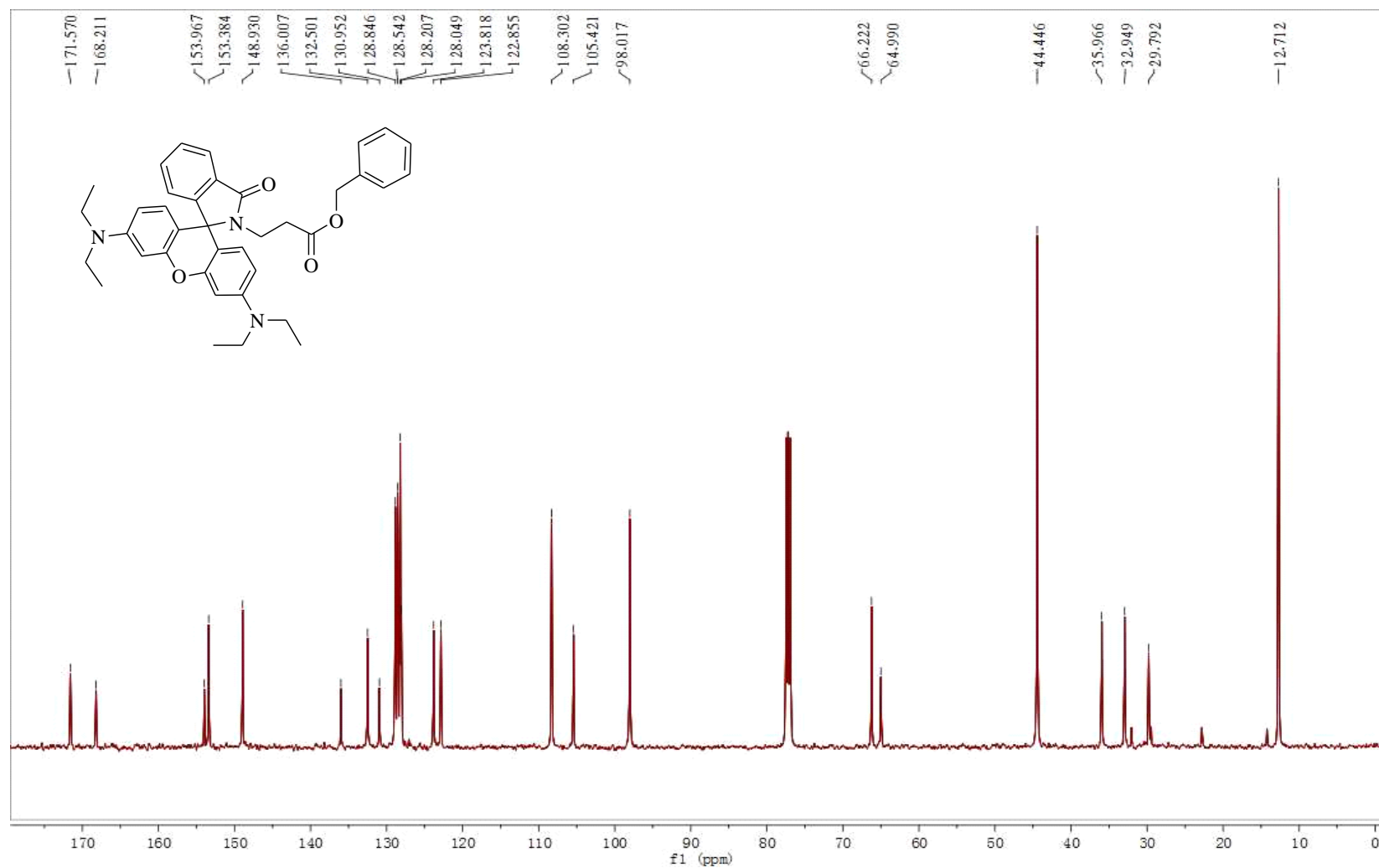
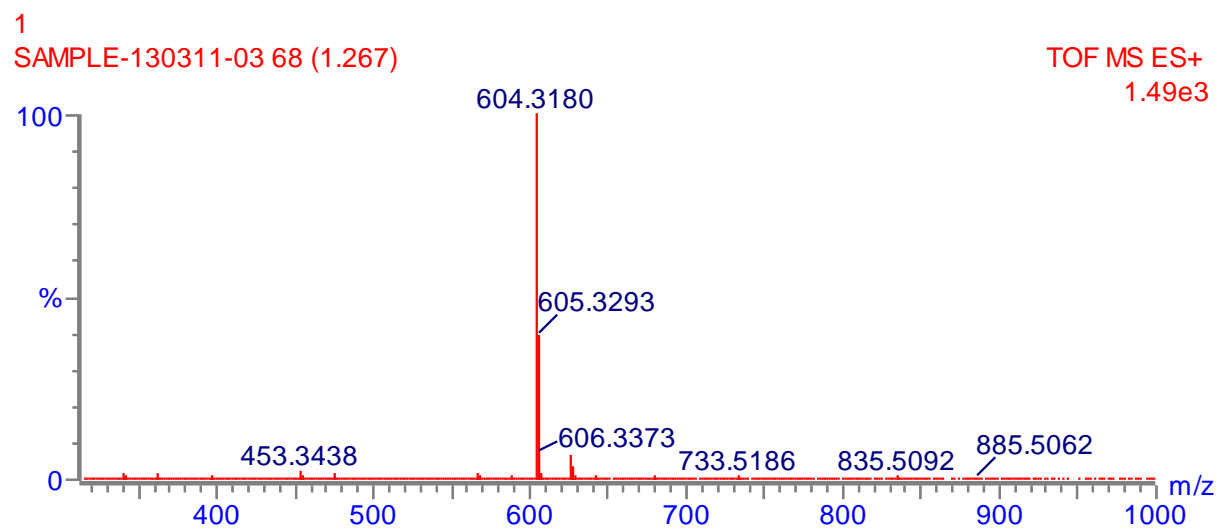
Figure S2. ^{13}C -NMR of RBAP in CDCl_3 .

Figure S3. HRMS of RBAP.



Crystallographic data of RBAP

^a $w = 1/[\sigma^2(F_o)^2 + (0.0893P)^2 + 1.6528P]$, where $P = (F_o^2 + 2F_c^2)/3$

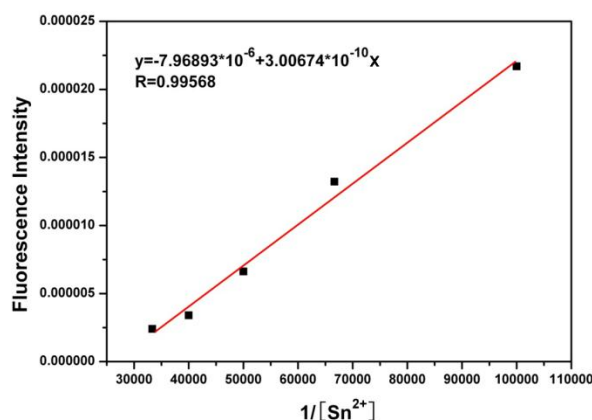
complex	RBAP
Formula	C ₃₈ H ₄₁ N ₃ O ₄
Formula weight	603.74
Crystal system	Monoclinic
space group	<i>P</i> 2(1)/C
a (Å)	12.5467(15)
b (Å)	22.338(3)
c (Å)	12.0855(14)
α (°)	90.00
β (°)	103.278(2)
γ (°)	90.00
Volume(Å ³)	3296.6(7)
Z	4
T, (K)	296(2)
μ (mm ⁻¹)	0.079
D _{calcd} (g/m ³)	1.216
F(000)	1288
Reflections collected	6128
Unique reflections	4350
Goof	1.036
R ₁ [I > 2σ(I)]	0.0645
wR ₂ [I > 2σ(I)]	0.1745 ^a
CCDC	CCDC 969599

Calculation of Association Constant

The apparent association constant was calculated by the following formula: $F - F_0 = \Delta F = [\text{Sn}^{2+}](F_{\text{max}} - F_0)/(1/K_a + [\text{Sn}^{2+}])$, where F is the obtained fluorescence intensity of **RBAP** with different equivalent of Sn^{2+} at the emission wavelength, F_{max} is the saturated fluorescence intensity of **RBAP** with different equivalent of Sn^{2+} at the emission wavelength, and F_0 is the fluorescence intensity of **RBAP** at the emission wavelength. Plot $1/\Delta F$ against $1/[\text{Sn}^{2+}]$ to a linear relation formula ($y = A + Bx$, Figure S4). K_a was calculated from $A/B = 7.96893 \times 10^{-6}/3.00674 \times 10^{-10} = 2.65 \times 10^4 \text{ M}^{-1}$. (Table S1, Figure S4).

Table S1. Detailed Calculations for Ka.

$[\text{Sn}^{2+}](\text{M})$	$1/[\text{Sn}^{2+}]$	F	F - F ₀	$1/(F - F_0)$
0		5000(F ₀)		
1.00×10^{-5}	1.00×10^5	5.11×10^4	4.61×10^4	2.17×10^{-5}
1.50×10^{-5}	66,666.67	8.06×10^4	7.56×10^4	1.32254×10^{-5}
2.00×10^{-5}	50,000	1.56×10^5	1.51×10^5	6.62291×10^{-6}
2.50×10^{-5}	40,000	2.99×10^5	2.94×10^5	3.4007×10^{-6}
3.00×10^{-5}	33,333.33	4.21×10^5	4.16×10^5	2.40186×10^{-6}

Figure S4. Plot $1/\Delta F$ against $1/[\text{Sn}^{2+}]$ to a linear relation formula ($y = A + Bx$).

Determination of Detection Limit

The detection limit of RBAP for Sn^{2+} was determined from the following equation: $\text{DL} = K * (\text{SD}/S)$, where $K = 3$; SD is the standard deviation of the blank solution detected for 5 times; S is the slope of the calibration curve. SD value calculated from standard deviation of the blank solution (RBAP (10 μM) in a methanol/ H_2O (2:3, v:v)) is 66.14 (Table S3). From Figure S5 we get slope = 4515. Thus, using the formula we get the Detection Limit = $3 \times (66.14/4515) = 0.044 \mu\text{M}$.

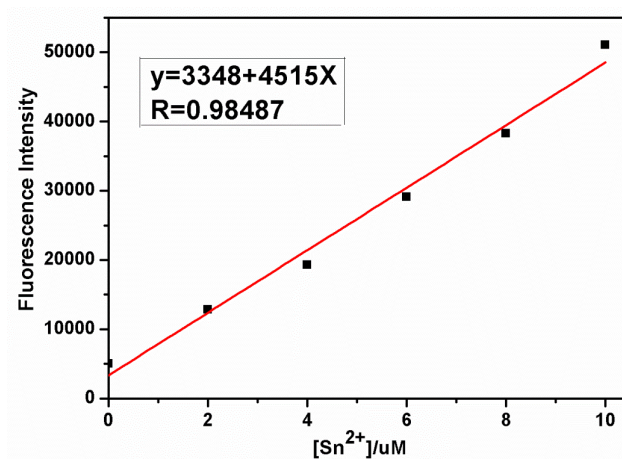
Figure S5. Fluorescence intensity at 583 nm of RBAP (10 μM) as a function Sn^{2+} concentration.

Table S2. Calculation for $SD = \sqrt{\frac{1}{N-1} \sum_{i=1}^N (X_i - \bar{X})^2}$.

F.I. of the Blank Solution		$X_i - \bar{X}$ (I = 1, 2, 3, 4, 5)	$(X_i - \bar{X})^2$		SD
X_1	5124	76.4	Y_1	5836.96	
X_2	4963	−84.6	Y_2	7157.16	
X_3	5057	9.4	Y_3	88.36	
X_4	5000	−47.6	Y_4	2265.76	
X_5	5094	46.4	Y_5	2152.96	
average value \bar{X}		5047.6	$SD^2 = (Y_1 + Y_2 + Y_3 + Y_4 + Y_5)/4$		66.14

Figure S6. Absorbance of **RBAP** at 561 nm as a function of Sn^{2+} concentration.

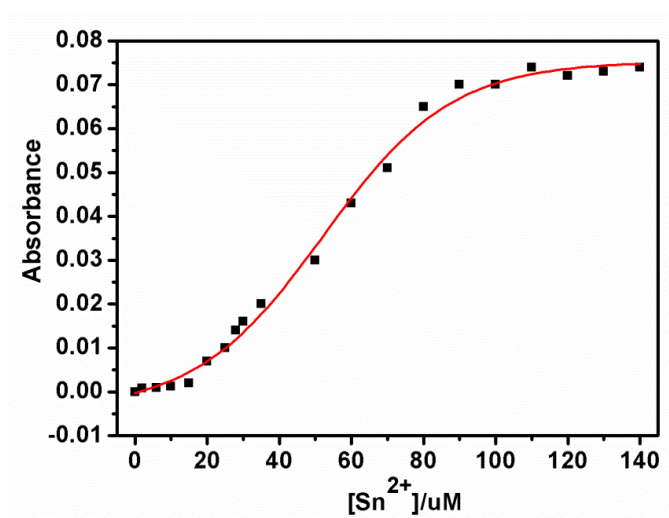


Figure S7. Fluorescence intensities of **RBAP** at 583 nm upon the addition of Sn^{2+} .

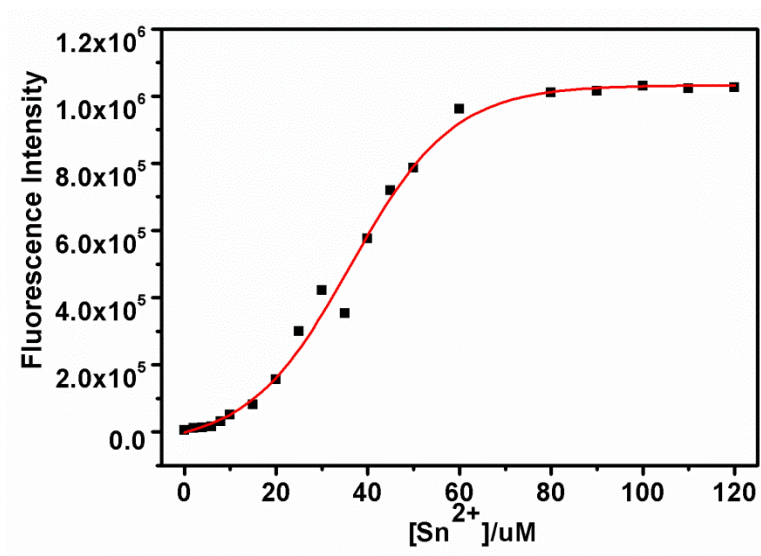


Table S3. HOMO-LUMO energy calculated for **RBAP** and the **RBAP-Sn²⁺** complex.

Species	E(HOMO)	E(LUMO)	ΔE (Hartree)	ΔE (kcal/mol)
RBAP	−0.19	−0.03	0.16	102.38
RBAP-Sn²⁺	−0.38	−0.30	0.09	55.74

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