Electronic Supplementary Information (ESI) for

A responsive anionic wormlike micelle using pH-directed release of stored sodium based on the polybasic acids

Pengxiang Wang,[a] Wanli Kang,[a] Shujie Tian,[b] Xia Yin,[a] Yilu Zhao, [a] Xiaoyu Hou, [a] Xiangfeng Zhang [a] and Hongbin Yang*[a]

[a] School of Petroleum Engineering, China University of Petroleum (East China), Qingdao 266580, Shandong, P.R. China.

[b] School of Mathematics and Statistics, Northeast Petroleum University, Daqing 163318, P.R. China.

***Corresponding Author:** yhb0810@126.com.

Additional Results

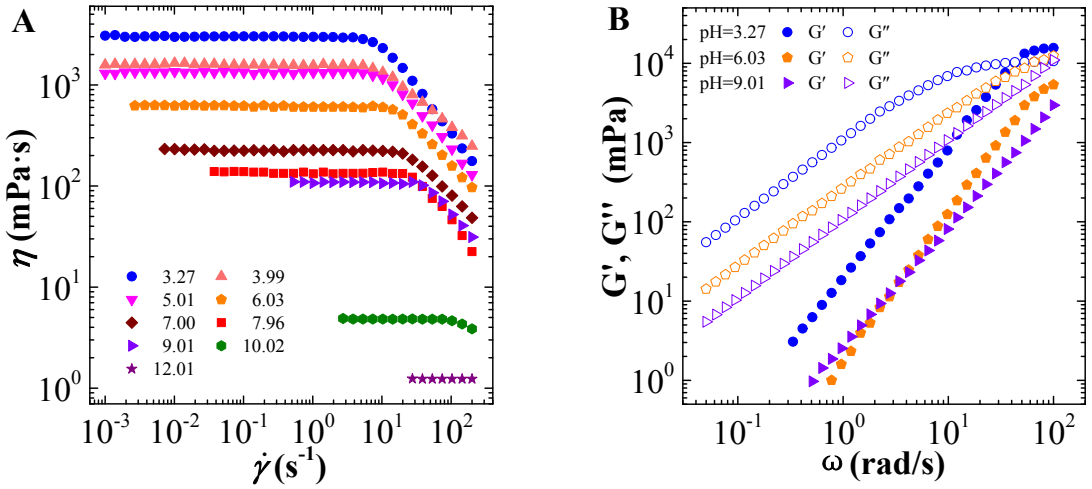


Fig.S1 Effect of pH value on steady (A) and dynamic (B) rheological of "200 mM SDES + 200 mM $EDTA^{4-}{\cdot}4Na^{+}$" solution at 25℃.

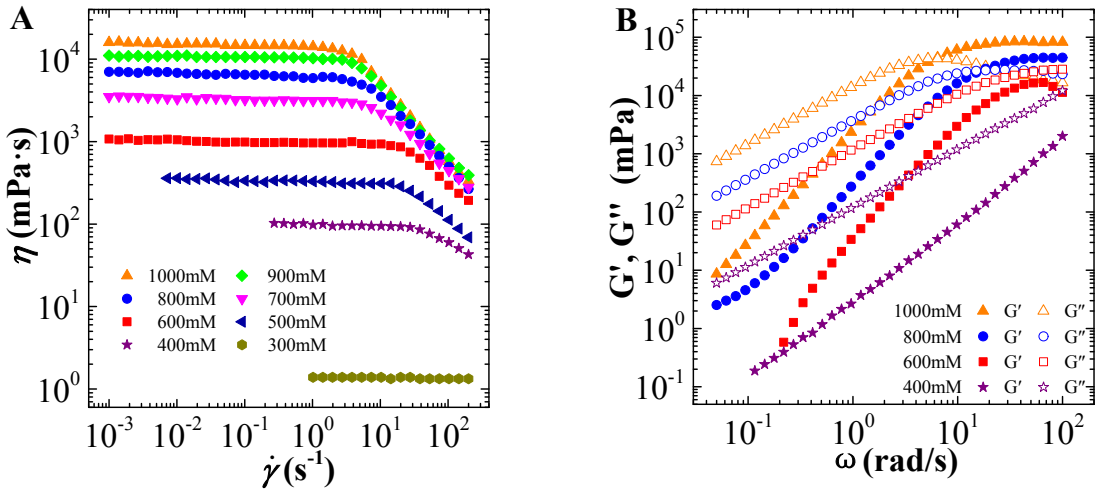


Fig.S2 Effect of NaCl concentration on steady (A) and dynamic (B) rheological of SDES/NaCl solution at 25℃ and pH=7.25.

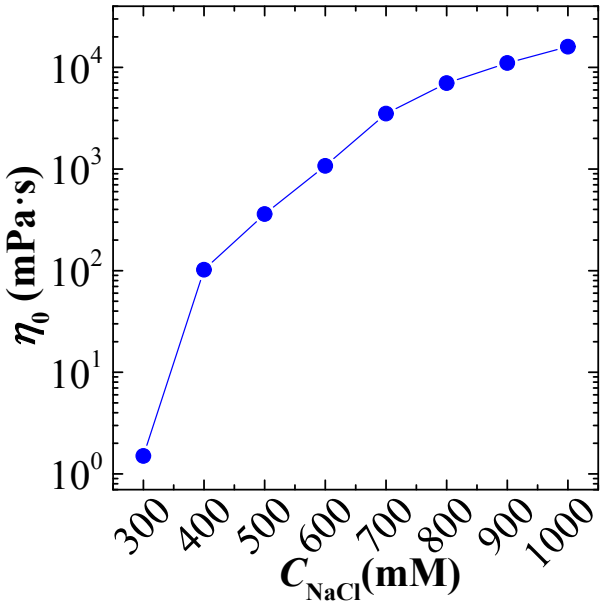


Fig.S3 Zero-shear viscosity (η_0) of SDES/NaCl solution plotted as a function of NaCl concentration at 25℃and pH=7.25.

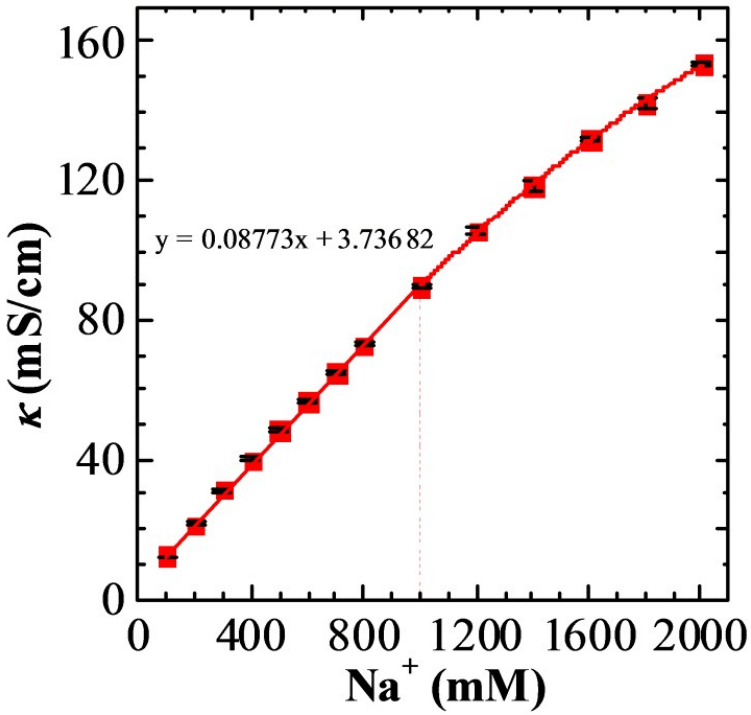


Fig.S4 Electrical conductivity (κ) of NaCl solution plotted as a function of concentration at 25℃and pH=7.25.

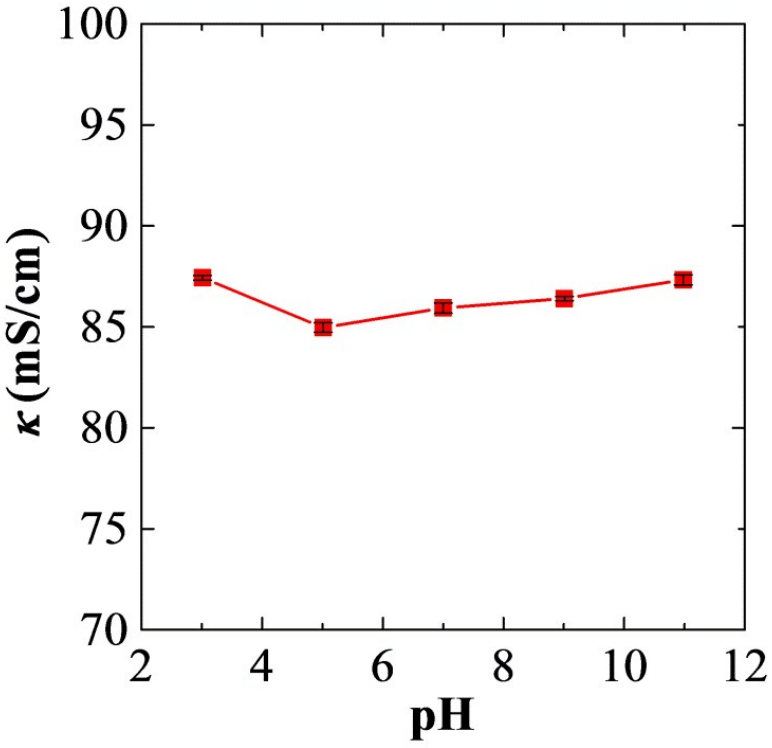


Fig.S5 Electrical conductivity (κ) of NaCl solution plotted as a function of pH at 25℃.

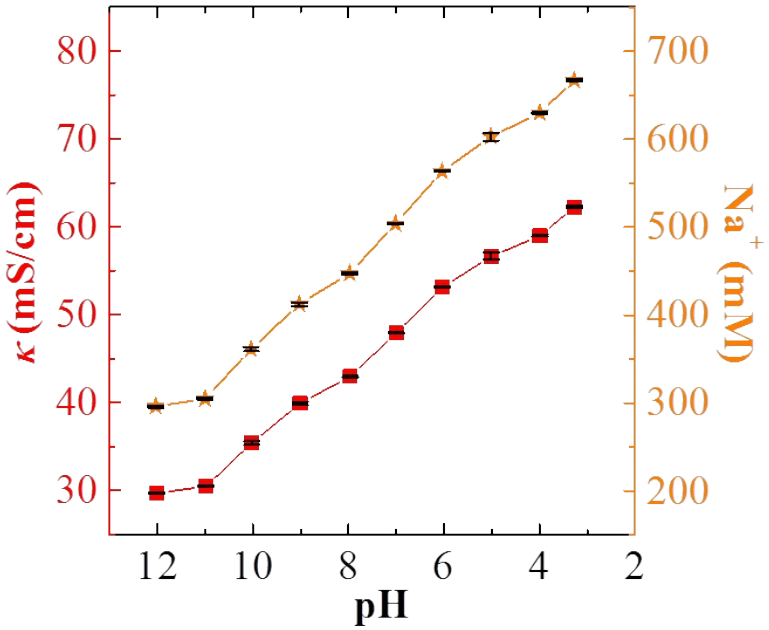
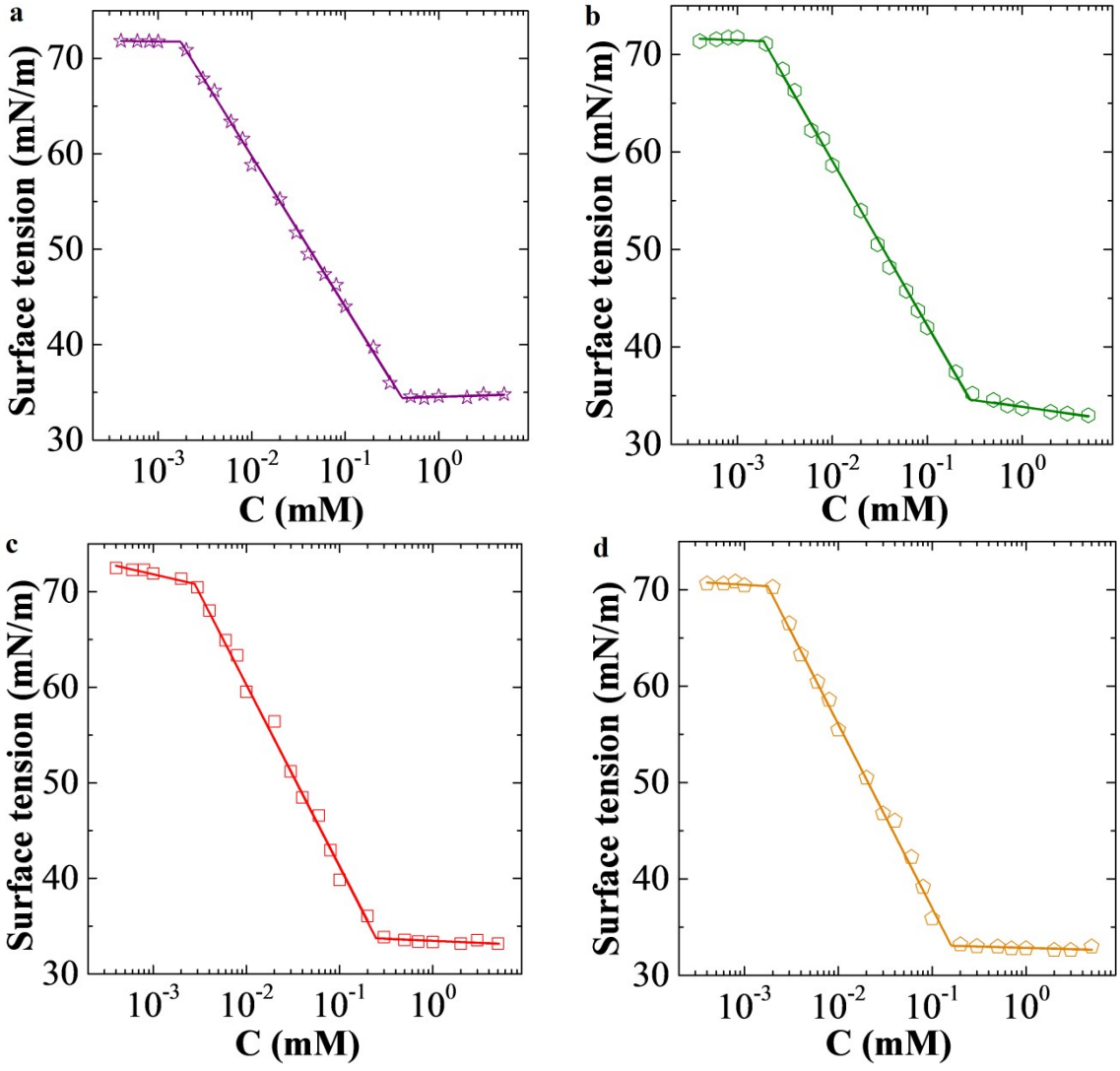


Fig.S6 Electrical conductivity (κ) (red) and R-Na^+ (yellow) of $EDTA^{4-}$·$4Na^+$ solution plotted as a function of HCl at 25℃.



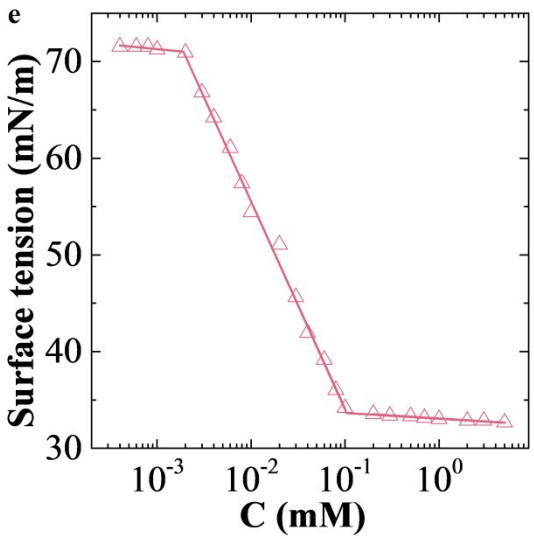


Fig.S7 Variation in surface tension with concentration of SDES/$EDTA^{4-}$·$4Na^{+}$ at 25℃. (a: pH=12.01, b: pH=10.02, c: pH=7.96, d: pH=6.03, e: pH=3.99)

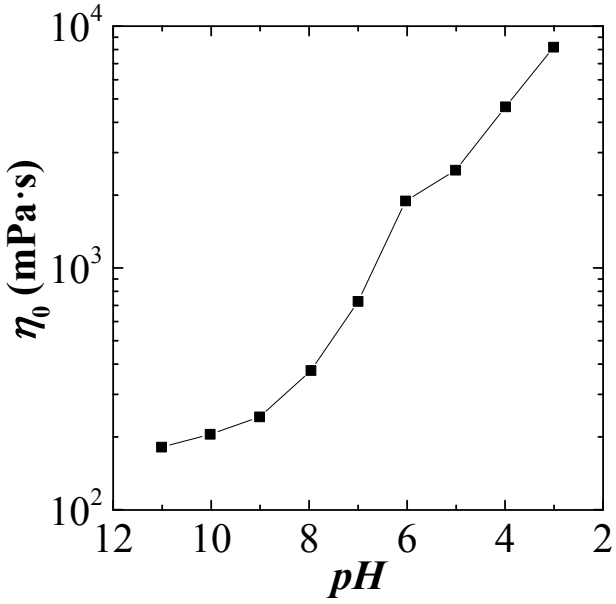


Fig.S8 Zero-shear viscosity (η_0) of "200 mM SDES + 300 mM CA^{3-}·$3Na^{+}$" solution plotted as a function of pH at 25℃.

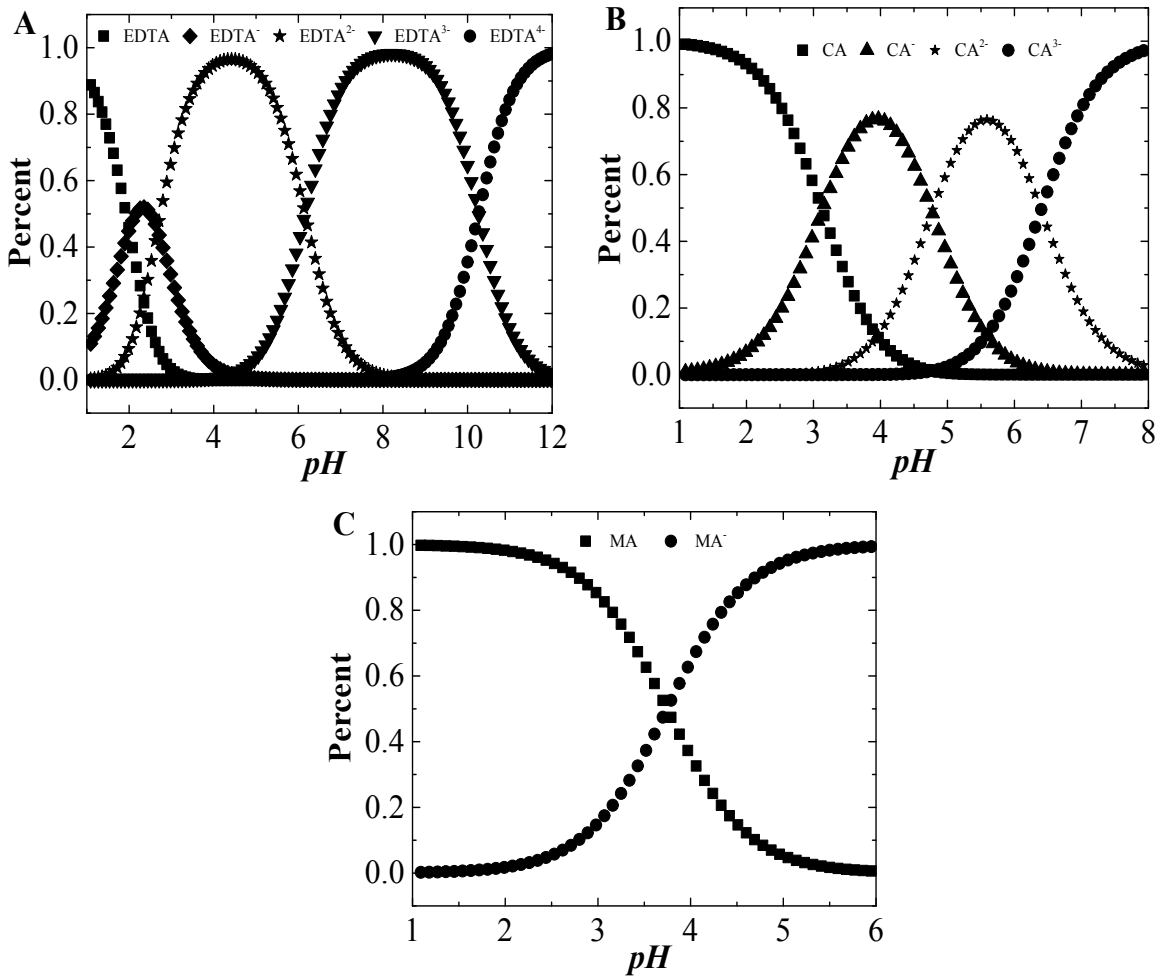


Fig.S9 Species distribution resulting from an aqueous solution of EDTA (a), CA (b) and HCOONa (c) at 25 °C.

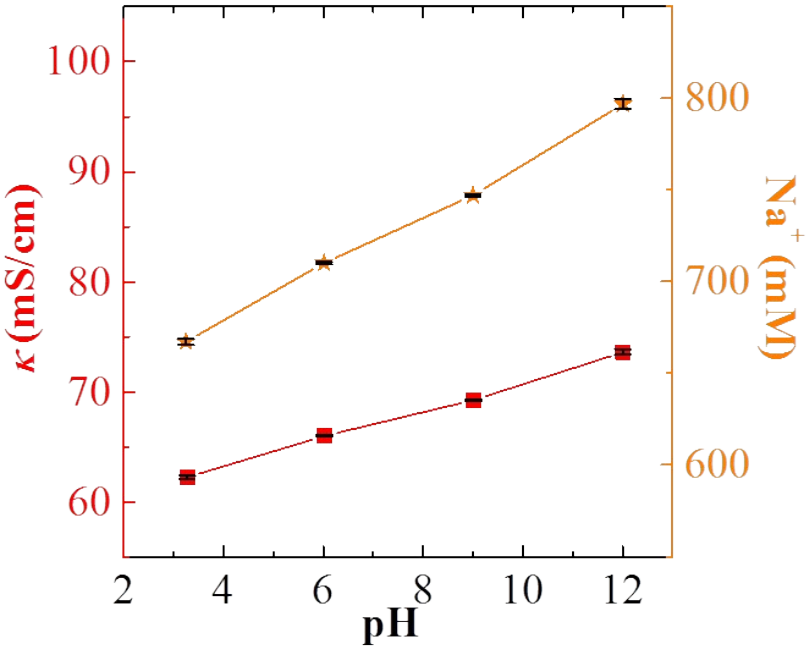


Fig.S10 Electrical conductivity (κ) (red) and R-Na^+ (yellow) of $EDTA^{4-}{\cdot}4Na^+$ solution plotted as a function of NaOH at 25℃.

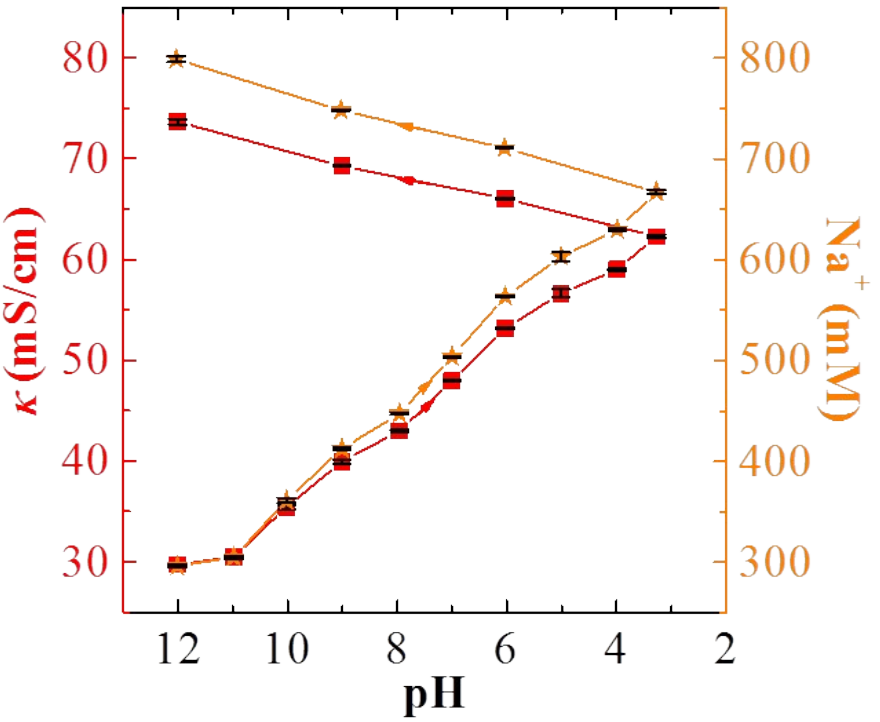


Fig.S11 Electrical conductivity (κ) (red) and R-Na^+ (yellow) of "200 mM SDES + 200 mM $EDTA^{4-}$·$4Na^+$" solution plotted as a function of pH at 25℃.

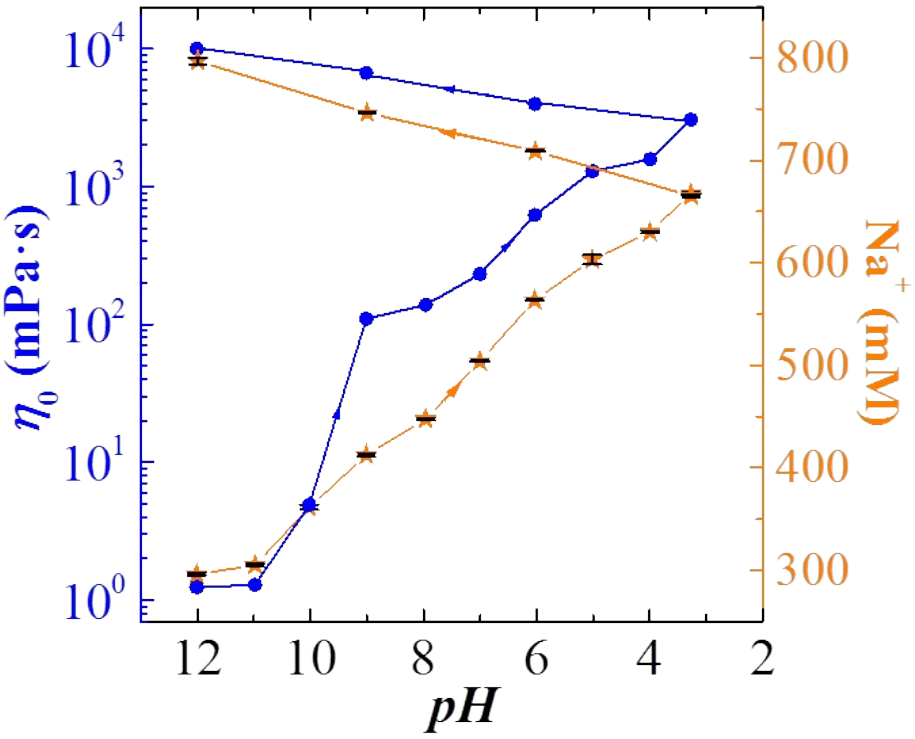


Fig.S12 Zero-shear viscosity (blue) and R-Na+ (yellow) of "200 mM SDES + 200 mM $EDTA^{4-}$·$4Na^+$" solution plotted as a function of pH at 25℃.

Table.S1 The species distribution percent of EDTA at pH 3.27 and 12.30 at 25 °C.

Species / Percent (%) / pH	EDTA	$EDTA^{-}\cdot Na^{+}$	$EDTA_2^{-}\cdot 2Na^{+}$	$EDTA^{3-}\cdot 3Na^{+}$	$EDTA^{4-}\cdot 4Na^{+}$
3.27	1.16	20.55	78.20	9.62×10^{-2}	9.41×10^{-9}
12.30	5.32×10^{-27}	1.16×10^{-16}	5.44×10^{-07}	0.82	99.18

The concentration of Na^{+} in 200mM EDTA aqueous solution by modifies the pH with NaOH at 25 °C:

$$c_{(Na^{+})} = (P_{(EDTA^{-})} + P_{(EDTA^{2-})}\cdot 2 + P_{(EDTA^{3-})}\cdot 3 + P_{(EDTA^{4-})}\cdot 4)\cdot 200$$

pH=3.27:

$$c_{Na^{+}(3.27)} = 354 \text{ mM}$$

pH=12.30:

$$c_{Na^{+}(12.30)} = 798 \text{ mM}$$

The concentration differences of Na^{+}:

$$\Delta c_{(Na^{+})} = c_{Na^{+}(12.30)} - c_{Na^{+}(3.27)} = 444 \text{ mM}$$