“On-off-on” fluorescent probes based on nitrogen-doped carbon dots for hypochlorite and bisulfite detection in living cells

Ruoming Wang\textsuperscript{a}, Ruixia Wang\textsuperscript{a}, Dongyan Ju\textsuperscript{a}, Wei Lu\textsuperscript{a, b}, Chunzhu Jiang\textsuperscript{a}, Xueru Shan\textsuperscript{a}, Qian Chen\textsuperscript{a}, Guoying Sun\textsuperscript{a, b}\textsuperscript{*}

\textsuperscript{a} School of Chemistry and Life Science, Changchun University of Technology, 2055 Yanan Street, Changchun 130012, P. R. China

\textsuperscript{b} Advanced Institute of Materials Science, Changchun University of Technology, 2055 Yanan Street, Changchun 130012, P. R. China
**Figure S1** Illustration of the tunable PL emission from surface state of N-CDs.

**Figure S2** (a) Fluorescence lifetime of N-CDs, (b) Fluorescence lifetime of N-CDs with ClO⁻.

**Figure S3** (a) Response time of the N-CDs with ClO⁻, (b) pH-dependent of the N-CDs with ClO⁻.
Figure S4 (a) Selective PL response of N-CDs aqueous solution towards ClO⁻. (b) Selectivity of N-CDs /ClO⁻ to HSO₃⁻.

Figure S5 Fluorescence spectra of N-CDs (green), N-CDs+GSH+H₂O₂ (blue), N-CDs+ClO⁻ (brown) and N-CDs+ClO⁻+H₂O₂+GSH (pink)

Figure S6 (a) The photo of N-CDs fluorescence, (b) N-CDs fluorescence quenched by ClO⁻, (c) N-CDs fluorescence recovered by HSO₃⁻.
**Figure S7** UV-vis absorption of N-CDs (blue), N-CDs with ClO\(^{-}\) (black) and N-CDs with ClO\(^{-}\) and HSO\(_3\)^{-} (pink).

**Figure S8** (a) High-resolution XPS C1s, (b) N1s and (c) S2p of N-CDs with ClO\(^{-}\) S2p, (d) S2p of N-CDs/ClO\(^{-}\) with HSO\(_3\)^{-}.