## Supplementary Materials

**Table S1.** Effect of sulfur species on $NO_2$ absorption in the FGD

| Type of slurry | Type of additive | Main comment | References |
|---|---|---|---|
| $Na_2SO_3$<br>$(NH_4)_2SO_3$ | | Sulfite is beneficial for $NO_2$ absorption. $NH_4^+$ can inhibit the dissolution of $O_2$ into water, so $(NH_4)_2SO_3$ solution has a higher $NO_2$ absorption rate compared with $Na_2SO_3$ solution. | Guo et al. [1] |
| $Na_2SO_3$,<br>$Na_2S_2O_3$,<br>$K_2SO_3$, et al. | | An appropriate amount of $SO_2$ could promote the removal of NOx. $O_2$ exhibited an inhibition of $NO_2$ removal and a promotion of NO removal. | Hao et al. [2] |
| NaOH | | Nitrite and nitrate produced by NOx absorption can be removed through a neutralization reaction with NaOH. Also, $Na_2SO_3$ produced by $SO_2$ absorption in NaOH increases $NO_2$ absorption. | Kang et al. [3] |
| Sodium humate solution | | $NO_2$ improves the $SO_2$ absorption into the HA-Na solution because $NO_2$ may promote the oxidation of sulfite to sulfate. | Hu et al. [4] |
| $Ca(OH)_2$<br>$CaSO_3$ | | The negative effect of $O_2$ on $NO_2$ removal in the presence of $SO_2$ was due to the oxidization of $SO_3^{2-}$ to $SO_4^{2-}$. | Chen et al. [5] |
| $CaSO_3$ | $FeSO_4$,<br>$MnSO_4$,<br>$(NH_4)_2SO_4$, et al. | $S^{IV}$ ($HSO_3^-$, $SO_3^{2-}$) has a positive role in $NO_2$ removal efficiency. | Wang et al. [6] |
| $CaSO_3$ | $MgSO_4$<br>$Na_2SO_4$<br>$MgCl_2$ | $SO_4^{2-}$ promotes the capacity of dissolved sulfite species, and natural $MgSO_3^0$ plays the same role as $SO_3^{2-}$ in $NO_2$ absorption. | Tang et al. [7] |
| $Ca(OH)_2$ | $Ca(NO_3)_2$<br>$Ca(NO_2)_2$ | The oxidation of sulfite to sulfate by $NO_2$ is in favor of the hydrolysis of $SO_2$ in the water film on the surface of the sorbent. | Gao et al. [8] |
| Sulfite<br>Thiosulfate | | High $NO_2$ removal efficiencies could be maintained over extended periods of time because of thiosulfate, which inhibits sulfite oxidation. | Schmid et al. [9-10] |

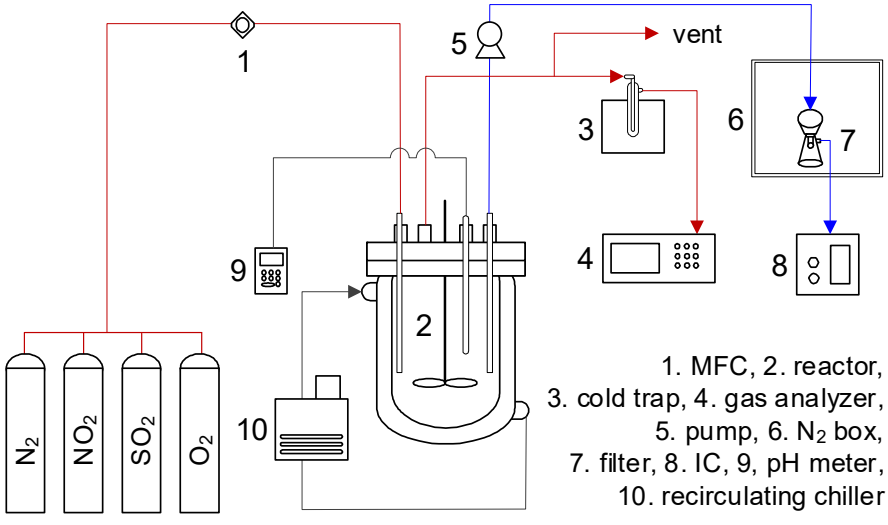


**Fig. S1.** Schematic diagram of the experimental setup.

**Table S2.** pKa and pKb values of organic additives at 25℃

| organic acid | formula | pKa | pKb |
|---|---|---|---|
| formic acid | HCOOH | 3.75 | |
| acetic acid | $CH_3COOH$ | 4.76 | |
| propionic acid | $CH_3CH_2COOH$ | 4.87 | |
| triethanolamine | $(HOCH_2CH_2)_3N$ | 7.74 | 6.26 |
| diethanolamine | $(HOCH_2CH_2)_2NH$ | 8.88 | 5.12 |
| monoethanolamine | $HOCH_2CH_2NH_2$ | 9.50 | 4.50 |

## References


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