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**Achieving Advanced Nitrogen Removal from Low C/N Wastewater by
Combining Endogenous Partial Denitrification with Anammox in Mainstream
Treatment**

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Abstract: Successful application of mainstream anammox would be favorable for energy- and resource-efficient sewage treatment. This study presents a new strategy to achieve mainstream anammox, which combined with endogenous partial denitrification (EPD) for treating sewage wastewater. In this EPD-Anammox system, nitrite was stably produced by EPD with a nitrate-to-nitrite transformation ratio of 80%. Through adjusting the volume exchange ratio of EPD-reactor after anaerobic reaction, a suitable $\text{NO}_2^- \text{-N}/\text{NH}_4^+ \text{-N}$ ratio of ~ 1.20 for anammox reaction was achieved. Further, results showed a stable, high nitrogen removal efficiency (90%) with an effluent total nitrogen of 5.8 mg N/L under low C/N (~ 2.9). Anammox contributed 49.8% of the overall nitrogen removal owing to the steady nitrite supply from EPD. Denitrifying glycogen-accumulating organisms (GAOs, 36.6%) having potential for endogenous denitrification and *Candidatus Brocadia* (34.6%) were respectively dominated in the EPD-SBR and anammox-UASB and responsible for the

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