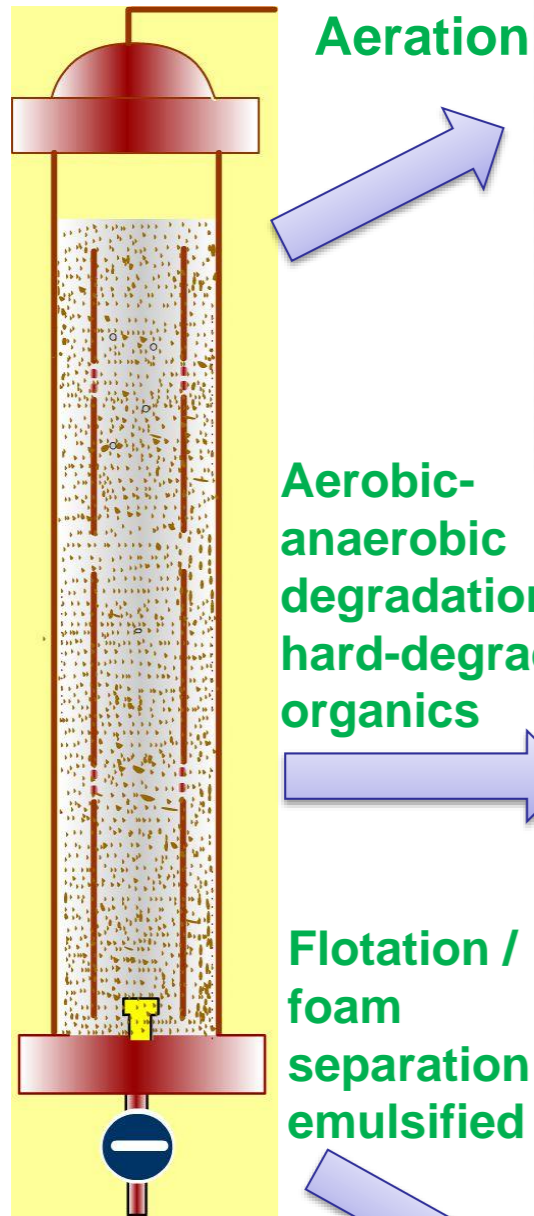
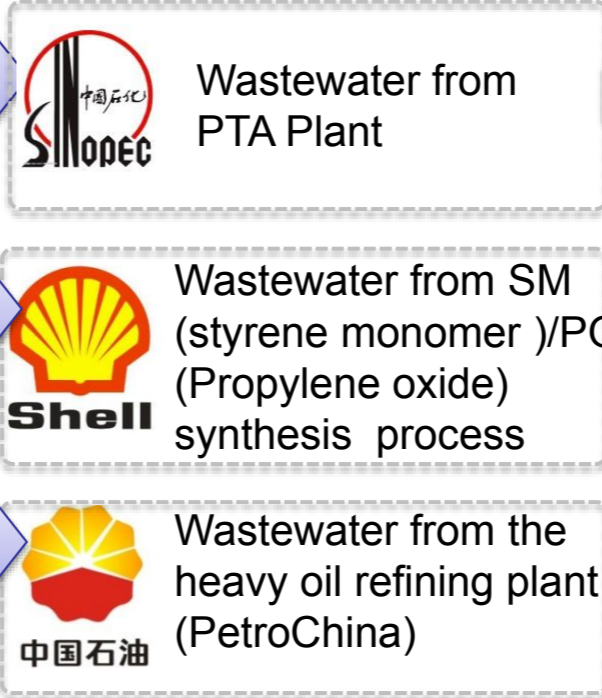
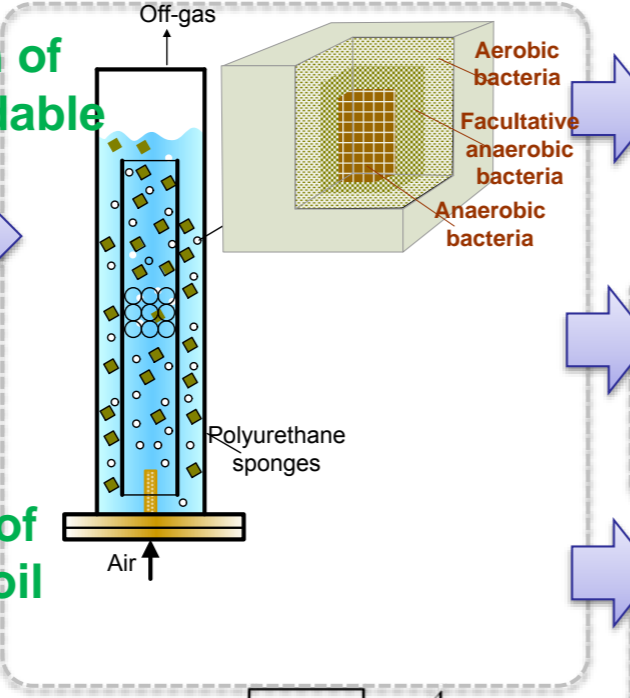


# INTRODUCTION

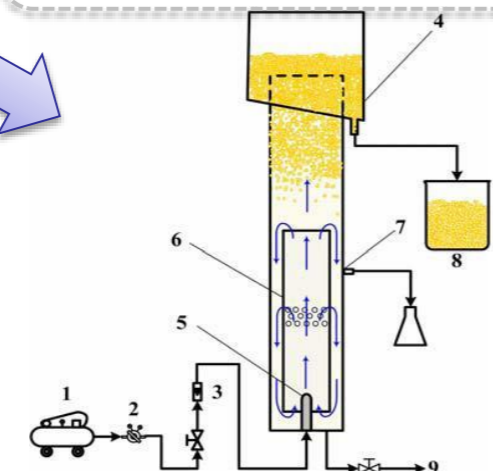


- Higher DO (6~8 mg/L) and Sludge density (4~6 g/l)
- Better Mix and mass transfer
- Shorter HRT (5~6 h)
- Smaller Floor space (cut 80%)
- Less Excess sludge



- Simple process
- Higher capacity (COD reaching 4000 mg/L)
- Higher performance (>95% COD removal)
- Abundant Microorganism
- Removal of ammonia-nitrogen [reaching 0.2 kg N/(m<sup>3</sup>·d)]
- Less Excess sludge

**Multi-stage Air-lift Loop Reactor(MALR)**  
 Simple construction/ Better mix and transfer / Larger gas-liquid contact area / Higher efficiency



Foam separation of emulsified oil in wastewater from the heavy oil refining plant (PetroChina)

- Larger gas- liquid contact area
- For emulsion droplet size ~ 2μm, Removal rate > 95%
- lower energy consumption