Supporting materials

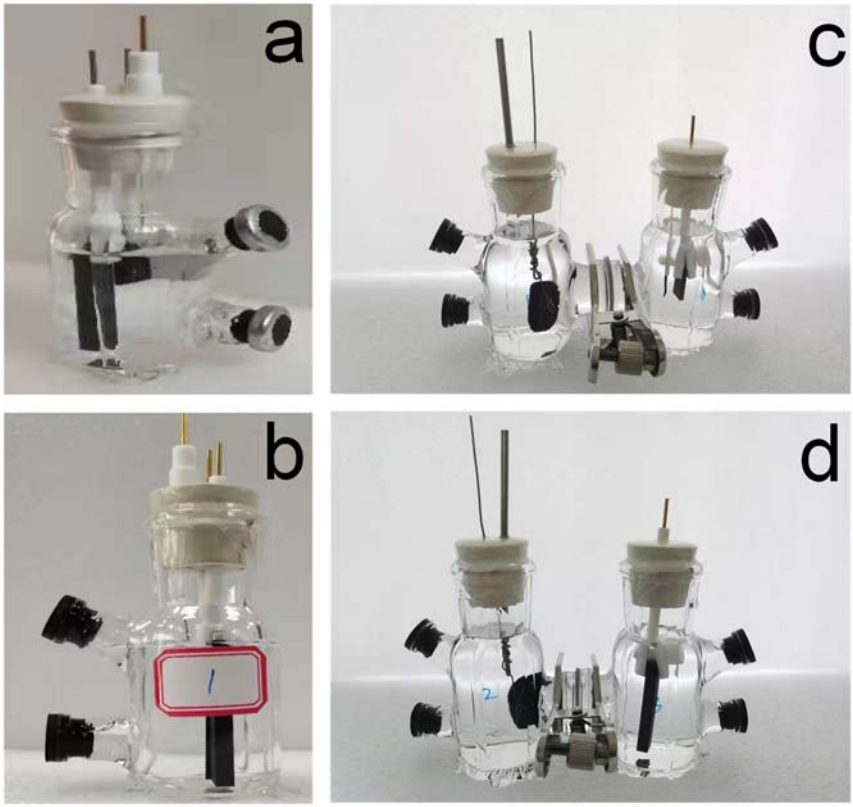

Fig. S1 The photos of reactors used in this study. (a) single-chambered abiotic cell equipped with boron-doped diamond (BDD) anode, (b) single-chambered abiotic cell equipped with graphite anode, (c) two-chambered microbial electrosynthesis (MES) reactor equipped with boron-doped diamond (BDD) anode and biocathode, (d) two-chambered MES reactor equipped with graphite anode and biocathode

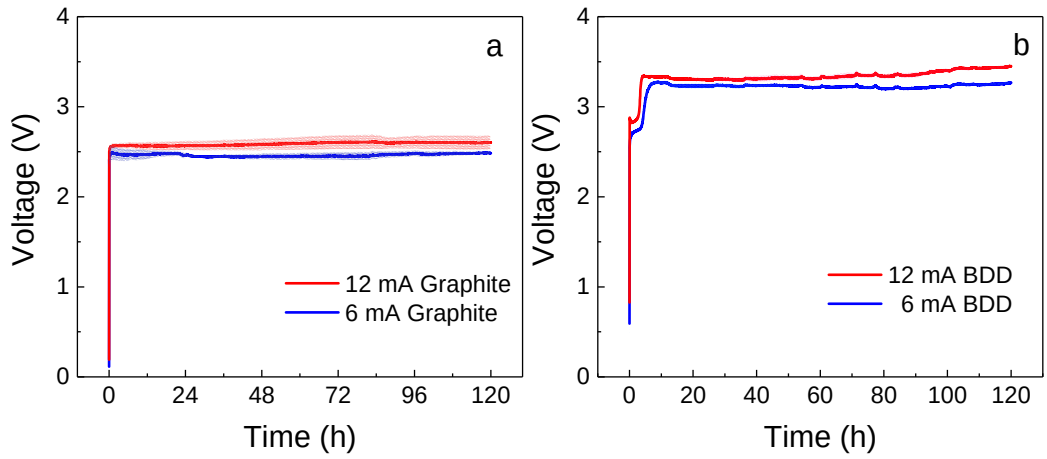

Fig. S2 The voltage of single-chambered abiotic cells for ammonia removal from synthetic urine: (a) using graphite anode, (b) using BDD anode

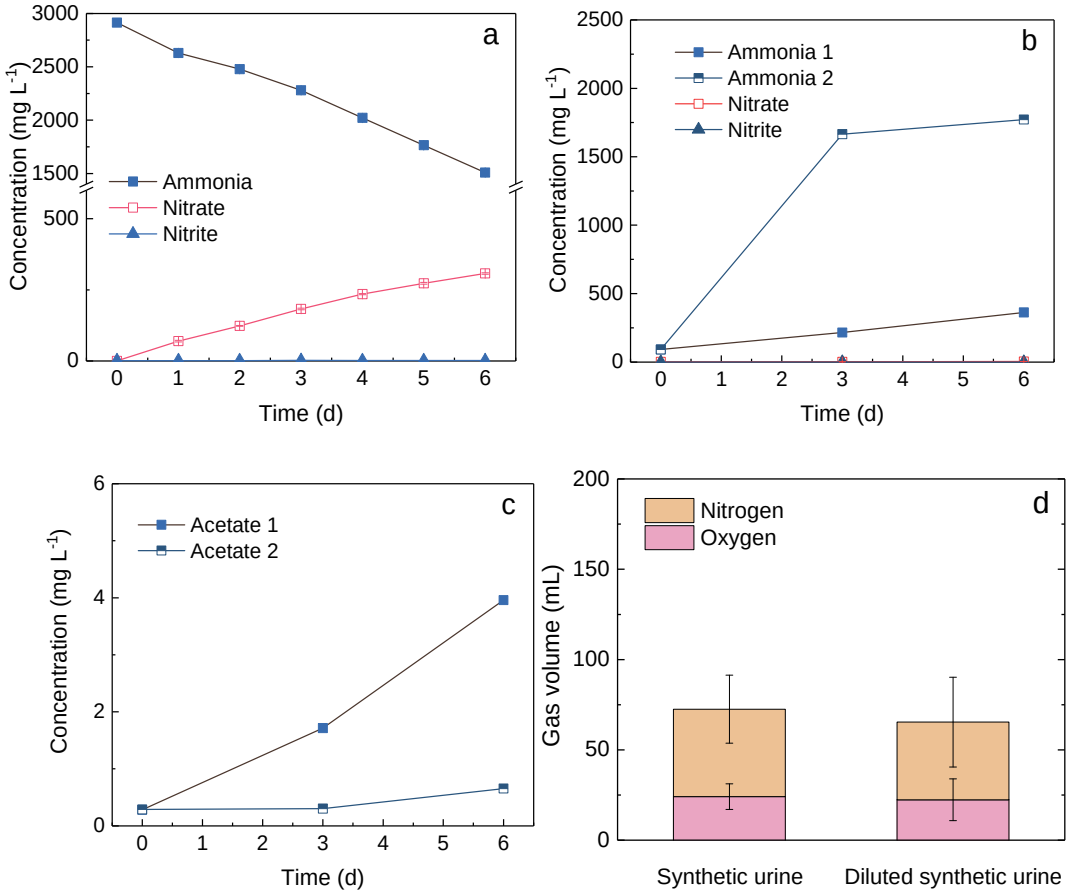

Fig. S3 MES reactors for the simultaneous ammonia removal from undiluted synthetic urine and acetate production from CO_2: (a) concentration of ammonia, nitrate, and nitrite in the anode chamber with graphite anode, (b) concentration of ammonia, nitrate, and nitrite in the cathode chamber, (c) acetate concentration in the cathode chamber, (d) volume of produced gases in the anode chamber. The concentrations of ammonia and acetate exhibited low parallelism, and thus the experimental duplicates (marked with 1 and 2) are displayed separately

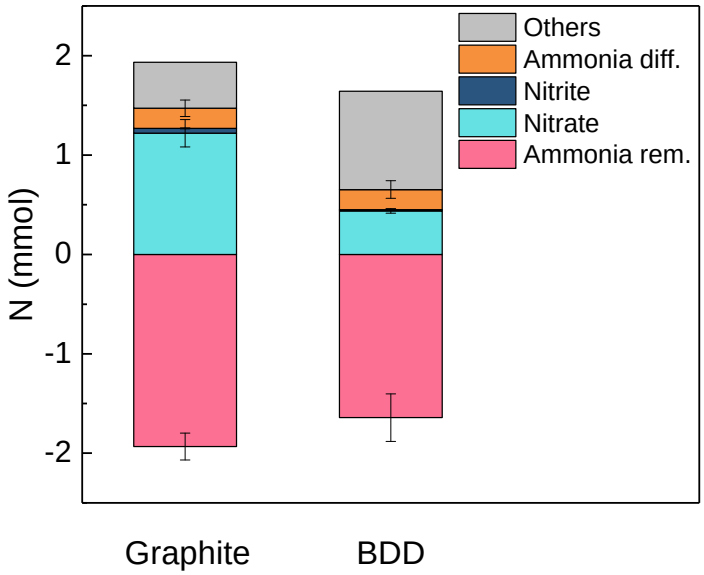

Fig. S4 The ammonia to different products balance of the MES reactors feeding with 10 times diluted synthetic urine. The ammonia removal (rem.) was plotted with a negative value while the ammonia diffusion (diff.) from the anode chamber into the cathode chamber was also considered. The others were mainly consisted of nitrogen gas

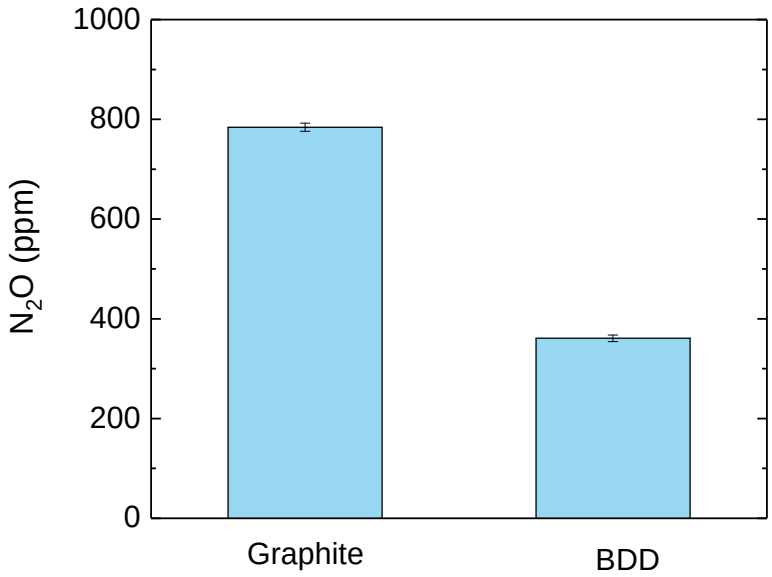

Fig. S5 The generation of nitrous oxide gas in single-chambered abiotic cells for ammonia removal from 10 times diluted synthetic urine using a graphite anode and a BDD anode. The current was fixed at 12 mA and the cells were operated for 5 days to measure the generated nitrous oxide gas

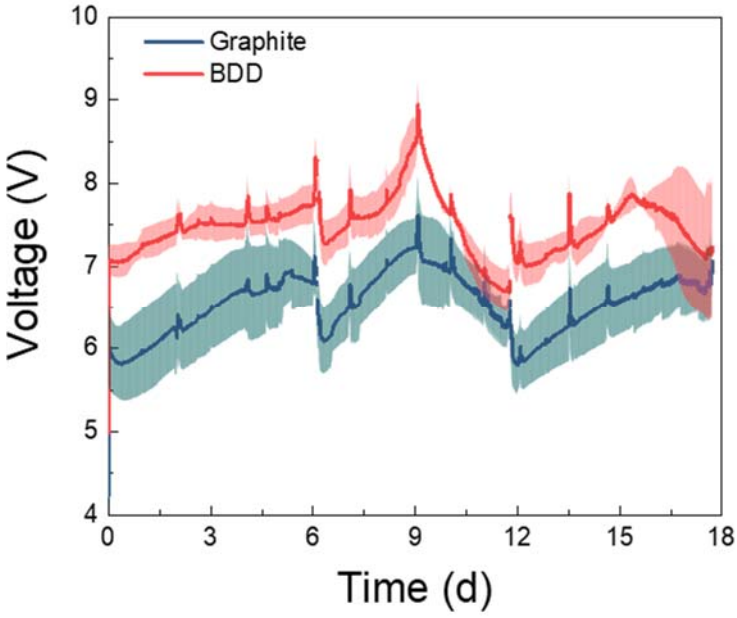

Fig. S6 The voltage of MES reactors for the simultaneous ammonia removal and acetate production. Here, 10 times diluted synthetic urine was added in the anode chamber

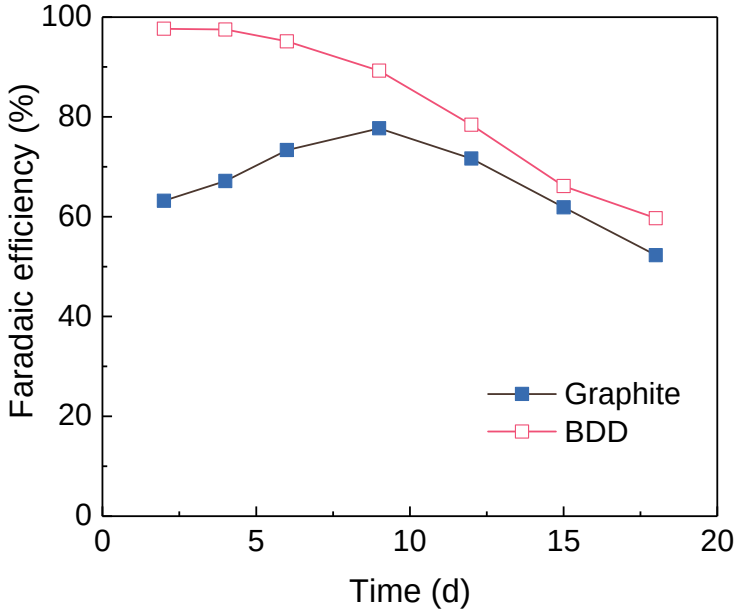

Fig. S7 Faradaic efficiency of MES reactors for acetate production. Here, 10 times diluted synthetic urine was added in the anode chamber

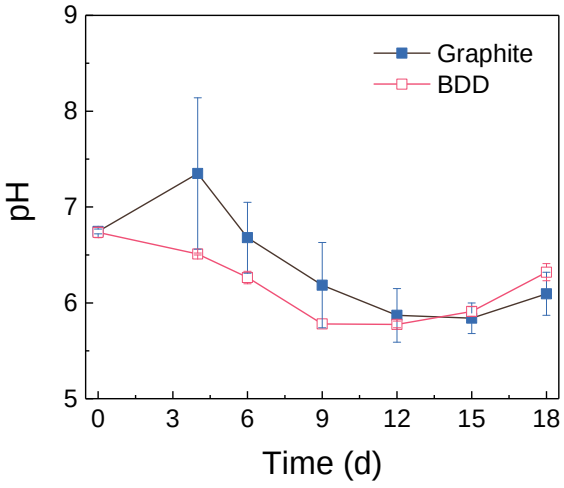

Fig. S8 The pH of the catholyte in MES reactors for the simultaneous ammonia removal and acetate production. Here, 10 times diluted synthetic urine was added in the anode chamber

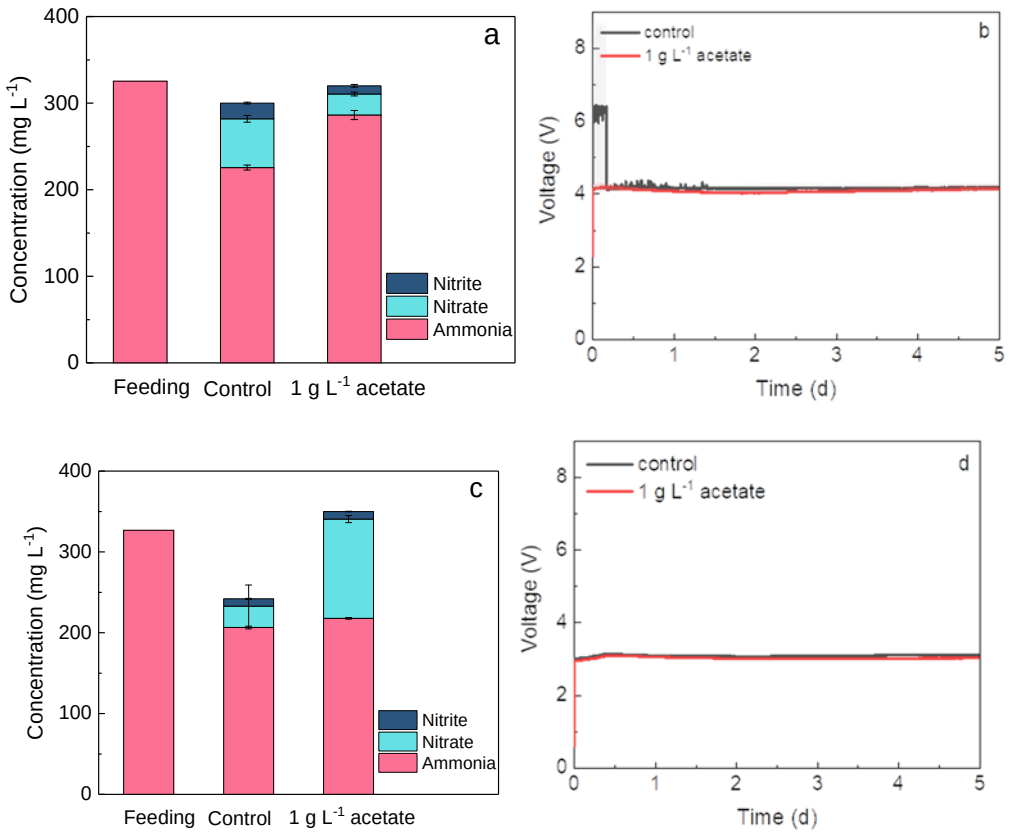

Fig. S9 Electrochemical oxidation for ammonia removal from synthetic urine in the single-chambered abiotic cells with the presence of 1 g/L acetate: (a) concentrations of ammonia, nitrate, and nitrite with BDD anode, (b) the cell voltage with BDD anode, (c) concentrations of ammonia, nitrate, and nitrite with graphite anode, and (d) the cell voltage with graphite anode. Acetate was not detected in the end of the experiments with BDD anode, while only 52% ± 4% of acetate was removed in the end of the experiments with graphite anode

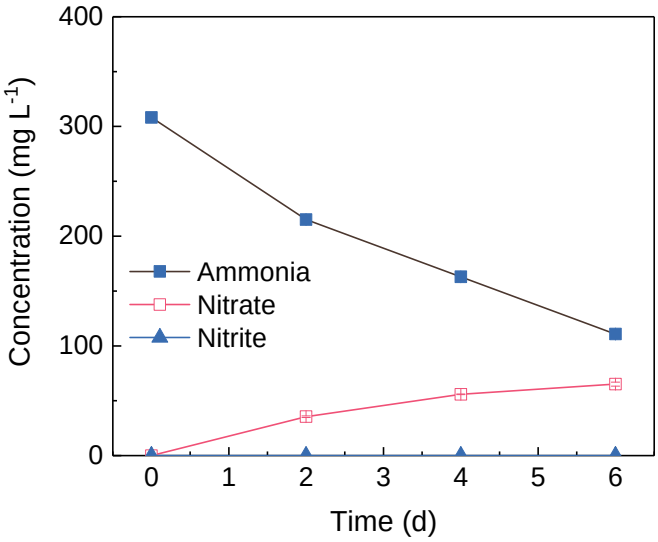

Fig. S10 Concentration of ammonia, nitrate, and nitrite in the anode chamber of abiotic control with BDD anode in H-type reactors. The current was 12 mA

Table S1 Characteristics of the raw activated sludge

Item	Value
pH	7.51
Suspended solids (g/L)	69.79
Volatile suspended solids (VSS, g/L)	46.46
COD (mg/L)	39294.23
Moisture content (%)	93.02
Ammonia (mg/L)	817.63
Nitrate (mg/L)	31.06#
Nitrite (mg/L)	0.81