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## A detection system for the heating value of sludge based on microbial fuel cells

Shaoan Cheng, Weifeng Liu, Haobin Huang and Fujian Li  
Zhejiang University, China

The heating value of sludge is an important index for the combustion characteristic and energy utilization value of sludge. However, current detection methods for heating value generally require complicated apparatus, complicated measurement steps and long detection time, making them difficult to be practically applied in wastewater treatment plants. In the present study, a novel detection system based on microbial fuel cells was established to determine the heating value of sludge. Four sludges from different wastewater treatment plants were employed to investigate the feasibility of the detection system for heating value measurement. Results showed that the MFC functioned well when using sludge as the substrate. High power outputs were obtained under the optimal external resistance (300  $\Omega$ ). The MFC can start-up quickly (within 2~14 h) and run steadily for over 56 h with a maximum current output. The heating value of sludge showed a significant linear correlation with the current output of MFC. According to this relationship, an estimation formula for the heating value of sludge was established, so the heating value of sludge can be predicted accurately. The detection system developed in this work has the advantages of easy operation, low cost and short detection time, thus is promising to be applied in wastewater treatment plants for the detection of sludge heating value.

### Biography

Shaoan Cheng did his BS(1983) and PhD(1995) in Materials Science and Engineering from Zhejiang University. In 1998-2001 he was a Visiting Professor at Basque University, Spain. In 2001-2003 he joined as a Postdoctoral fellow at The University of Hong Kong. He became a Research Associate in 2006-2007 and is Senior Research Associate from 2008 to present in Civil and Environmental Engineering, Penn State University, USA.

shaoan Cheng@zju.edu.cn