Sensors and Materials, Vol. 26, No. 1 (2014) 19–30 MYU Tokyo

S & M 0966

Zirconia Ceramics Applied in a Pressure-Sensitive Device Fabricated Using HTCC Technology

Qiu Lin Tan^{1,2,3}, Li Qin^{1,2,*}, Hao Kang^{1,2,**}, Ji Jun Xiong^{1,2,***}, Wen Dong Zhang^{1,2}, Tao Luo^{1,2}, Chen Li^{1,2}, Li Qiong Ding^{1,2}, Xian Sheng Zhang^{1,2} and Ming Liang Yang^{1,2}

 ¹Key Laboratory of Instrumentation Science & Dynamic Measurement, Ministry of Education, North University of China, Tai Yuan 030051, China
²Science and Technology on Electronic Test & Measurement Laboratory, North University of China, Tai Yuan 030051, China
³National Key Laboratory of Fundamental Science of Micro/Nano-Device and System Technology, Chongqing University, Chong Qing 400044, China

(Received June 16, 2013; accepted September 9, 2013)

Key words: zirconia ceramic, high-temperature cofired ceramics (HTCC), capacitive pressure sensor, wireless passive sensor, LC circuit, mutual inductance coupling

A wireless passive high-temperature cofired ceramic (HTCC) pressure sensor fabricated from partially stabilized zirconia (PSZ) ceramic is proposed. This sensor can be used in high-temperature environments (in excess of 1000 °C in some cases) owing to its high mechanical strength at high thermal stress, and pressure data can be transmitted through mutual inductance coupling. Experimental systems are designed to obtain the necessary frequency-pressure and frequency-temperature characteristics. The experimental results between room temperature and 800 °C (and then at 800 °C for 30 min) indicate that the sensor has improved stability at 800 °C and the sensor also shows a high sensitivity at room temperature.

**Corresponding author: e-mail: kanghao_0217@sina.com

***Corresponding author: e-mail: tanqiulin@nuc.edu.cn

^{*}Corresponding author: e-mail: qinli@nuc.edu.cn