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## A newly thermal convective angular accelerometer on polyimide substrate

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The key points of this work are as follows. (1) To make a thermal convective angular accelerometer directly on a flexible substrate (e.g. an engineering PI tape) so the new design can reduce the energy loss of heater to the substrate. Since the thermal conductivity of polyimide is 0.06-0.0017 W/(cm-K), it is about twenty-fifth that of the silicon (1.48 W/(cm-K)), thus these devices can preserve much energy than the previous ones without wasting to the environments. (2) To make both heater and thermal sensors directly on the PI substrate without floating over a grooved cavity on silicon wafer, so the device is more reliable and cheap. (3) one could increase the sensitivities by making nonfloating accelerometers on flexible substrates. Moreover, the thermal sensors were made to stack on a layer of aluminum nitride (with thickness 1 μm). (4) The chamber was filled with an inert gas (xenon) instead of carbon dioxide or air, thus one could completely avoid the oxidation effect of components, and increase both reliability and life cycle of the device. (5) The traditional rectangular chamber was replaced by a hemicylindrical one, such that the sensitivity could be improved. Practical device was made to prove the ideas of the new design. Finally, the device was put on a flight table for testing, a methodology to derive the formular between the temperature difference of the thermistors and the angular acceleration was made, and the sensitivity of the proposed angular accelerometer was 1.828r/s<sup>2</sup>/K.

### Biography

Lin was born in Taiwan 1952 and graduated from the Dept. of Electronic Engineering, National Chiao-Tung University at Taiwan in 1974. He achieved the Master and Ph. D Degrees from the same school of Institute of Electronics in 1976 and 1985, respectively. He was an adjunct professor and full professor since 1992 and 1996 at the Dept. of Mechanical Engineering, Chung-Hua University, Taiwan. Now he is at Dept. of Electronic Engineering and majors in the fields of planar speaker, RFID, accelerometer, rate gyro, avionics, and wireless measurement technique for health care. He also has several patents in the related areas.

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