Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supplementary materials

Sandwich-structured intelligent anti-icing/de-icing film with ice-oriented power self-regulating performance

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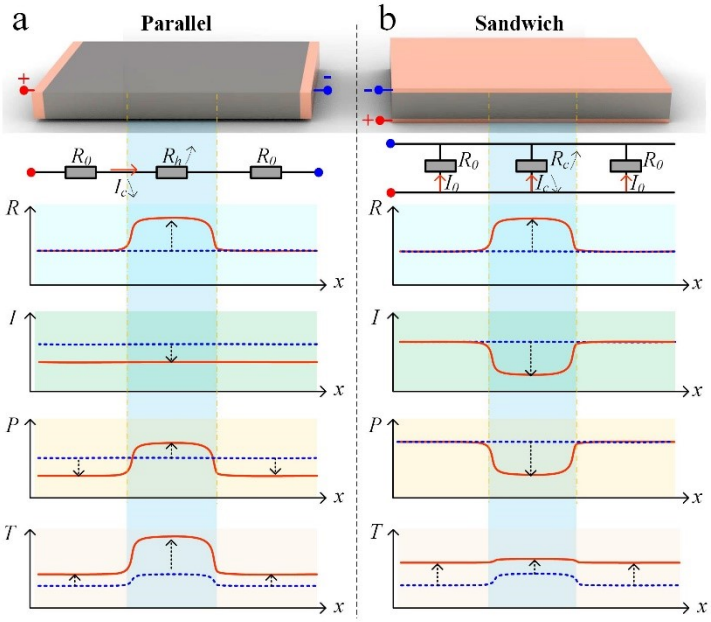

Figure S1. A nonsynchronous temperature rise at first will lead to a wider divergent difference on parallel PTC.

Actually, the line-like uneven heating performance is an inherent defect of parallel-structured PTC coating, where the micro-scale elements of coating are serial linked in the normal direction of electrodes; when the coating starts heating, a nonsynchronous temperature rise at first will lead to a wider divergent difference: considering a coating element performs resistance rise earlier than other elements, the distributive proportion of power output on this element will further increase due to the serial link, finally causing a divergent heat distribution. This can only be avoided on an absolutely uniform coating and uniform cold load, which is impractical in engineering.

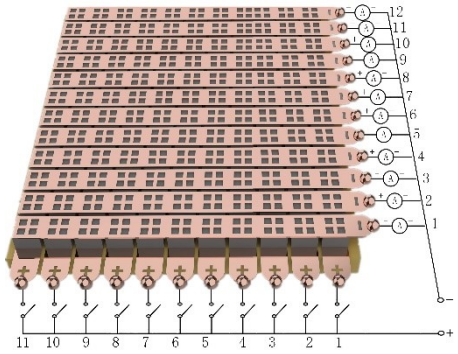

Figure S2. The currents scanning acquisition system for PS-PTC consisted of a 12-channel current data acquisition card (500 mA * 12) with an 11-channel switch module, and could scan 12*11 channels of currents at a rate of 300ms per channel, presenting the current variations of all 132 elements of PS-PTC film P10.

Video S1. A real-time cold load recognition system based on PS-PTC film sample P10.