Optimum engineering of a PtZn alloy for a highly efficient counter electrode in dye-sensitized solar cells

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This study presents the synthesis of PtZn alloys, with different volume ratio of Pt and Zn precursors, on the transparent conducting oxide (TCO) under atmospheric pressure, low temperature and without using any chemical toxic reagents. The developed materials were then applied as a low-cost and an efficient counter electrode (CE) of dye-sensitized solar cells (DSCs). The morphology of CEs was characterized by HRSEM. The formation of PtZn alloys was confirmed through TEM, and XRD measurements. The chemical formulae of alloys were determined by XPS measurements. And, the electrochemical catalytic activity was examined through CV, EIS, and Tafel measurements. The effect of CEs on the efficiency of DSCs was further confirmed by photovoltaic measurements. As the results, the PtZn alloy are successfully deposited on the TCO surface. Both electrical conductivity and catalytic activity of developed CE were higher than those of Pt and Zn CEs.