Design of Driving Waveform Based on a Damping Oscillation for Optimizing Red Saturation in Three-Color Electrophoretic Displays

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Abstract

The three-color electrophoretic displays (EPDs) technology has filled the gap in the color demand in the electrophoretic displays. However, there are problems of dim brightness and insufficient color saturation. In this paper, a driving waveform based on a damping oscillation is proposed to optimize the red saturation in three-color EPDs. The optimized driving waveform is composed of an erasing stage, a particles activation stage, a red electrophoretic particles purification stage, and a red display stage. Correspondingly, the driving duration is set to 360 ms, 880 ms, 400 ms, and 2400 ms, respectively. And the red electrophoretic particles purification stage is a damping oscillation driving waveform. The red and black electrophoretic particles are separated by changing the magnitude and polarity of the applied electric field so that the red electrophoretic particles are purified. The experimental result shows that the maximum red saturation could reach 0.583, which is increased by 27.57% compared with the traditional driving waveform.