



**Figure S1.** Images of coating films. 1: 3% (w/v) Polyvinyl alcohols (PVAs), 2: 3% (w/v) PVAs + 0.075% (w/v) cellulose nanocrystals (CNCs), 3: 3% (w/v) PVAs + 0.15% (w/v) CNCs, 4: 3% (w/v) PVAs + 0.3% (w/v) CNCs, 5: 3% (w/v) PVAs + 0.075% (w/v) CNCs + 1.5% (w/v) Beeswax, 6: 3% (w/v) PVAs + 0.15% (w/v) CNCs + 1.5% (w/v) Beeswax, and 7: 3% (w/v) PVAs + 0.3% (w/v) CNCs + 1.5% (w/v) Beeswax.