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### Settling behavior of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ particles in Acetone in the presence of lead (IV) oxides particles

Electrophoretic deposition of  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  is a promising non-vacuum method of film deposition due to its simplicity and scalability. In order to produce high quality films using this technique, it is necessary for the working suspension to be stable for long periods of time. In this study, we look at the interaction of YBCO and  $\text{PbO}_2$  particles when suspended in acetone. We determine if  $\text{PbO}_2$  is a suitable compound that will allow stability in the YBCO-acetone suspension. The choice of  $\text{PbO}_2$  is based from our previous work where it was shown that  $\text{PbO}_2$  can be used as a flux during the partial melting step of the deposition process. The colloidal properties of YBCO and  $\text{PbO}_2$  in acetone were measured using hydrodynamic size and zeta potential measurements. Results show that YBCO particles are positively charged when mixed in acetone, while  $\text{PbO}_2$  particles were determined to be negatively charged. In addition, upon testing the suspension of YBCO+ $\text{PbO}_2$  in acetone, zeta potential measurements show a decrease in magnitude with respect to settling time. The addition of more  $\text{PbO}_2$  into the YBCO-acetone suspension also pushed its zeta potential values to the unstable region ( $|\zeta| < 30$  mV). Due to this relatively strong Coulombic attraction of YBCO and  $\text{PbO}_2$  particles when mixed in acetone, electrophoretic deposition of YBCO with  $\text{PbO}_2$  will be difficult.

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