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Photo-induced surface reactivity and metallic nanoparticle deposition on ferroelectric Strontium Barium Niobate. EFTIHIA BARNES, LAWRENCE CHRISTOPHER MIMUN, JONATHON BRAME, AIMEE PODA, CHRISTOPHER WARNER, US Army Corps of Engineers, Engineer Research and Development Center, ENGINEER RESEARCH AND DEVELOPMENT CENTER TEAM — In recent years, ferroelectric photocatalysts have attracted considerable attention due to their internal dipolar fields which separate photo-induced charge carriers, potentially leading to increased photocatalytic activity. In addition, photochemically generated reaction products have been shown to be spatially localized on ferroelectric surfaces, indicating that electrons and holes are spatially separated in the bulk. In this work, we studied the photo-induced surface reactivity of ferroelectric $Sr_{0.4}Ba_{0.6}Nb_2O_6$ (SBN:40) and $Sr_{0.61}Ba_{0.39}Nb_2O_6$ (SBN:61) single crystals by employing photochemical marker reactions. In more detail, we investigated the effect of the excitation wavelength, light intensity, exposure time, concentration of the reaction solution, and domain configuration on the morphology and spatial distribution of photo-deposited metallic nanostructures. By tuning various parameters, such as the solution concentration and light intensity, we can achieve spatially uniform nanoparticle deposition or favor the formation of nanoparticle chains.

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