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Synthesis of $CaCu_3Ti_4O_{12}$ by wet-chemistry methods WAI-NING MEI, JIANJUN LIU, Department of Physics, University of Nebraska at Omaha, Omaha, NE 68182 USA, YUCHENG SUI, Department of Physics and Astronomy, University of Nebraska-Lincoln, Lincoln, NE 68588 USA, ROBERT W. SMITH, Department of Chemistry, University of Nebraska at Omaha, Omaha, NE 68182 USA
— $CaCu_3Ti_4O_{12}$ was reported to have a giant dielectric constant up to 10^4 at room temperature, which has tremendous potential for technological application. Solid-state synthesis of $CaCu_3Ti_4O_{12}$from component oxides requires repetitive grinding and firing at high temperature and long time (1000 ^{o}C, 20 hours). However, the resulting sample may still contain secondary phase or unreacted components. Whereas, the wet-chemistry method starts with a homogeneous liquid solution of cation ingredients with metal ions already mixed at the atomic scale. Therefore, the pure sample in nanometer scale can be obtained at low temperature with short time. In this work, we synthesized $CaCu_3Ti_4O_{12}$ by using two solution combustion methods at 700 ^{o}C and 5 hours. Two $CaCu_3Ti_4O_{12}$ precursors were obtained by combusting citrate-nitrate gel and acetate-nitrate solution, respectively. The phases of the precursors after treated at different temperature were characterized by using the X-ray diffraction.

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