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CHAPTER 10

Progress of Perovskite Materials with Surface Additives

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Abstract: The perovskite is shown to be the single most versatile ceramic, that hasgained much more attention fromresearchersdue to a huge numberof applications. Perovskite compounds providean enormous variety of structural modifications and variants. The perovskite-type oxides exhibit both physical and biochemical characteristics. Based on Perovskite-phase metal oxides, a distinct range of properties became useful for different applications. Perovskite materials have attractive characteristics in electrical conductivity, dielectric constant, dielectric loss, structural, and magnetic properties. Perovskite materials showed efficient essential properties for photovoltaic solar cells.

Keywords: Characterization, Classification, Dielectric properties, Perovskite materials, Synthesis.

1. INTRODUCTION

The perovskite structure has shown tremendous compositional versatility, integrating nearly every element of the periodic table. Perovskites and layered perovskites are of considerable concern as they show a wide range of useful properties. Important optical ferroelectric materials may be known as ferroelectric oxygen-octahedra with a common pattern structure of BO6 composed of six oxygens (O) around the central tetravalent or pentavalent transition metal ion as B. The cage of oxygen has 8 faces; thus, it is called an octahedron. The highest symmetry phase (usually the highest temperature phase) is called the paraelectric phase, in which the octahedron's geometric center is occupied by the time-average mean position of cation B. A Jahn-Teller octahedron distortion results in the formation of ferroelectricity at a lower temperature. This is accompanied by a displacement of the B ion from the cage's geometric center, which occurs during a

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