

Disclosed is a system and method for generating time variant and invariant electric fields (E-fields) for various applications. Generating the E-field utilizes high impedance dielectric materials having a collection of three imperative material properties: high permittivity (ϵ), high volume resistivity (ρ) and high maximum allowable E-field stress (ϕ) and physical geometries that take advantage of the manner in which E-fields are divided or distributed in series capacitance networks. The generated E-field can act upon a subject material, including a gas, liquid or solid, wherein the material is stationary or in motion. The method allows an E-field of given intensity to be set up in the subject material with a significantly lower applied voltage Φ_a , or conversely, a significantly higher E-field intensity with a given applied voltage Φ_a . The method forestalls electric conduction current through the subject material, thus significantly reducing electric conduction current, energy consumption, ohmic heating, and preempting electrochemical reactions at the electrode/fluid interfaces. Acoustic energy may also be applied.