Editorial

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Editorial Note on Metamaterials

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Editorial Note

Metamaterials are without a doubt the most recent breakthrough in the field of unusual materials and complex media study. Within the scientific community working on complex media, the name has been offered. To discover a new class of manmade materials with unusual electromagnetic properties that cannot be found in natural materials. The Greek word ‘‘meta" has been employed in the sense of ‘‘emergence" of new qualities from a specific combination of materials showing ordinary electromagnetic behaviours, according to this definition and the general point of view of that community. The most prevalent meaning of the prefix ‘‘meta" in metamaterials nowadays is ‘‘beyond," as in the word metaphysics.

Metamaterials are artificial constructed materials that display unique or uncommon qualities that are not found in natural materials at the frequencies of interest, allowing them to overcome some of the limits encountered when employing natural materials in microwave and optical components. This definition is also in line with the official one adopted by the ‘‘Virtual Institute for Artificial Electromagnetic Materials and Metamaterials," the world's first and only international society on metamaterials. The first and most well-known class of metamaterials is made up of materials that have negative real portions of both permittivity and permeability at the same time. Double-negative (DNG) materials, negative index materials (NIM), left-handed materials (LHM), and backward (BW) media are all terms used to describe such materials.

The genesis of such names can be traced back to which of the unique qualities of this class of materials we want to emphasise. Furthermore, we should note that the first investigations on the fundamental properties of materials with negative real portions of permittivity and permeability are widely attributed to Russian physicist Veselago and originate from the 1960s. In the topic of metamaterials, two main research directions are now the most active. One line of research is on using metamaterials as loading materials in traditional microwave components. It is possible to acquire intriguing operation and anomalous qualities that allow for the circumvention of most of the major limits of conventional components, paving the way for new innovative ultra-compact devices with increased performance. The important word here is "key." The fact that metamaterials are not a new microwave technology, but rather a new way of thinking, is an important consideration. Of currently available technologies, the majority of metamaterial microwave-created samples, in reality, are based on the Printed circuit technology is a well-known technology.