

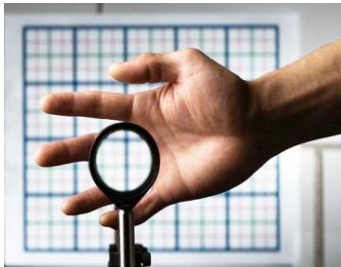


# META MATERIAL STUCTURE AND METHOD OF FABRICATING THE SAME

**Affiliation :** Korea university **Type of Partnership :** Open for negotiation **Cost :** Open for negotiation

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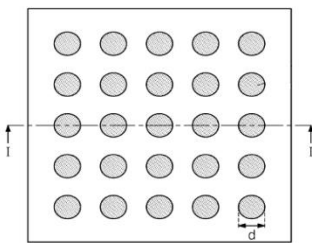
## Abstract

It is related to a method of manufacturing a meta-material structure, which can improve the optical properties to have a negative refractive index or a maximized refractive index and can be used in various fields such as a transparent cape, a high performance lens, a small antenna.

## Problems with Existing Technology

Research is needed because it is attracting attention as a next generation core technology with high potential

- Meta-materials are emerging as future innovation technology because they can be used in a variety of fields, including medicine, biophysics, spectroscopy, imaging and security.
- The meta-material structure is a structure with new properties that do not exist in the natural world, and it is also used in the production of transparent cloak, high performance lens, etc., contributing to advancement of high technology and domestic industry development



〈Floor plan of the meta-material structure〉

## Technology Readiness Level

TRL 4 : Technology validated in lab

TRL1	TRL2	TRL3	TRL4	TRL5	TRL6	TRL7	TRL8	TRL9
Basic Technology Research	Technology Concept formulated	Experimental Proof of Concept	Technology validated in lab	Technology validated in relevant environment	Technology demonstrated in relevant environment	System Prototype in operational environment	System complete & qualified	Full commercial application

## Differentiation and effect

### Differentiation

**Structures with new properties that do not exist in nature**

- The meta-material structure may have a maximized refractive index.
- Optical properties have been improved through the development of meta-material structures.

### Effect of Technology

**The optical properties of the meta-material structure can be improved**

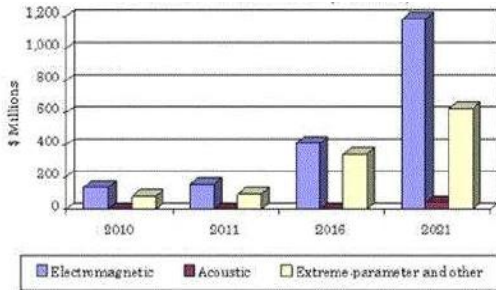
- It is possible to control the permittivity and refractive index of the meta-material structure by choosing the shape and kind of nanoparticles and the distance between nanoparticles.



## Technology Application Field

It can be used in various fields such as medicine, biophysics, spectroscopy, imaging and security, and can be specifically used for transparent cloak, high performance lens, small antenna, ultra sensitive sensor.

## Market trends



BCC Research, 2012.

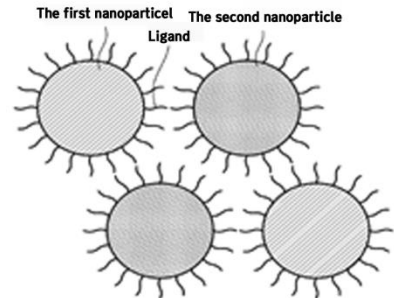
<Market size of meta-material application industry, billion USD>

- Metamaterial application market can be classified as electronic, sound, functional enhancement, etc.
- The size of the global metamaterial application market is expected to reach \$ 256.1 million in 2011 and \$ 1.9 billion in 2021, with an annual growth rate of 24.3%

## Technology Implementation

### The meta-material structure according to the present invention

- The metamaterial structure is provided on the substrate.
- includes patterns arranged in a direction parallel to the top surface of the substrate
- Each pattern includes a first nanoparticle and a second nanoparticle.
- The first and second nanoparticles can be electromagnetically coupled adjacent to each other.
- It can contain conductive ligands bound to the surface of the first and second nanoparticles



< Magnification of the meta-material structure >

## List of related patents

No.	Title of Invention	Patent No./ Application No.
1	METAMATERIAL STRUCTURE AND METHOD OF FABRICATING THE SAME	US 15/671,922
2	METHOD OF DUPLICATING TEXTURE AND PATTERN OF NATURAL MATERIAL USING LOW TEMPERATURE EMBOSsing PROCESS	US 15/363,700
3	COLOR FILTER	US 16/062,674