New Low Loss and Thermal Solutions Bring Huge Benefits to 6G Challenges

Friday 8 March, 2024

6G Communications will bring huge benefits as long the challenges are solved. New low loss and thermal solutions are an essential part of this.

Dr Peter Harrop, CEO of analysts Zhar Research says,

> “A market of over $10 billion awaits you if you solve its needs for better low loss and thermal materials and structures for 6G. These opportunities arrive mostly from higher frequencies, more power-hungry, hotter infrastructure and smaller client devices.”

The commercially-oriented 318-page Zhar Research report, “6G Communications Low Loss and Thermal Materials and Structures: Detailed Technology Analysis, Roadmaps and 32 Market Forecast Lines 2024-2044” is your essential roadmap. The authors recommend that you consider both topics together because many of your potential partners, competitors and research sources are involved in both. Indeed, some emerging materials such aerogel silicas have uses for both purposes. No other report is as thorough, insightful or up-to-date on the two subjects. The information is constantly updated so you only get the latest.

Questions answered include:

- Winning and losing chemistries and companies?
- Potential partners, acquisitions and emerging competition?
- 20-year roadmaps of decision making, technical capability, adoption?
- Gaps in the market. The unsolved problems that are your opportunities?
- Phase One and Phase 2 evolution of 6G with materials, frequencies, functionality?
- Thirty-two 20-year forecasts of 6G low loss and thermal materials and their hosts?
- Preferred compounds, morphologies, devices, frequencies, active regions emerging?

The analysis is mainly presented as new timelines, infograms, SWOT appraisals, graphs, tables, 20-year forecasts and roadmaps. No nostalgia or academic obscurity but a wealth of latest research papers appraised and much further reading referenced for you to dig deeper if you wish.

The Executive Summary and Conclusions is sufficient in itself if your time is limited. It has 30 pages of choices, trends, possibilities, impediments, SWOT appraisals and technology comparisons and 20 primary conclusions. All the forecasts and roadmaps are in the 27 following pages, each as both tables and graphs with commentary.

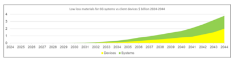
Chapter 2 Introduction takes 38 pages to critically explain the 6G dream and reality and introduce a large number of the materials and the manufacturing technologies involved.

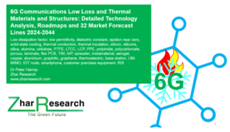
Chapter 3 at 58 pages is a core chapter of the report. Entitled, “Low loss materials and applications for 6G” It starts by explaining the important parameters for 6G dielectrics at device, board, package and reconfigurable intelligent surface RIS level. Understand the major changes in low-loss material choices from 5G to 6G. Here are thermoset vs thermoplastic vs inorganic compounds and the special cases of high resistivity silicon, phase change and electric-sensitive dielectrics for the arriving 6G THz frequencies and reasons for the increasing variety of dielectrics needed for 6G. Understand basic mechanisms affecting THz permittivity and seeking low loss through composites and porosity.

Permittivity 0.1-1THz for 19 dielectric families is displayed and compared plus dissipation factor 0.1-1THz for 16 dielectric families. The loss-frequency map is distilled into a choice of 14 families of low permittivity, low loss dielectrics for 6G against 5 criteria followed by detail. Infograms pull together the primary mentions of low loss and thermal materials in 6G research, the trend to integrated low loss materials for 6G and compromises with 6G low loss materials depending on format and application. They include, for example, polyphenylene oxide PPO, PPE, Noryl™ and why silica is one of the most popular porous options for 6G.

Understand low loss materials for 6G base stations and distributed equipment and the implications from traditional base station becoming ultra massive MIMO (UM-MIMO) for 6G even meta-radomes, low loss materials for reprogrammable intelligent surfaces in the propagation path and THz waveguides for 6G

Media:





Related Sectors:

Computing & Telecoms :: Consumer Technology :: Education & Human Resources :: Manufacturing, Engineering & Energy ::

Related Keywords:

6g :: Low Loss :: Thermal Materials :: Structure :: Technology :: Electronics :: SWOT :: 5g :: Thermal Hydrogel :: Solid State Cooling :: Metamaterials :: Smart Materials ::

Scan Me:

client devices, rooms and outdoors. Finally comes a SWOT appraisal of 6G low loss material opportunities. The nine-page Chapter 4. “Epsilon near zero ENZ materials and applications for 6G” explains that aspect.

Now comes a very comprehensive look at thermal materials for 6G. It starts with chapters on thermally conductive structure such as thermal interface materials and heat spreaders, depending on direction of heat dissipation because these are the largest commercial opportunity. In addition, evaporative, radiative and active and passive solid-state cooling and thermal insulation solutions are presented from the research pipeline and best practice for 6G applications.

46-page Chapter 5 opens the thermal material examination with “6G thermal management materials and applications: the big picture”. That is brought alive with 24-page Chapter 6. “Thermal management materials for 6G smartphones, IOT nodes and other client devices” followed by a speculative 18-page Chapter 7, “Wild cards for 6G thermal management: thermal metamaterial, thermal hydrogel, thermoelectric heat pump”. 17-page Chapter 8 concerns, “Solid state cooling” primarily meaning powered and unpowered smart materials that cool by being responsive and often multi-mode in function. This is because we believe that these should be more seriously considered by 6G developers, for example faced with at least ten times the power consumption and cooling requirement of 6G base stations compared to 5G. The report closes with 17 pages of Chapter 9 on, “Metamaterials for 6G communications” because these are involved in thermal management and other aspects.

The new report, “6G Communications Low Loss and Thermal Materials and Structures: Detailed Technology Analysis, Roadmaps and 32 Market Forecast Lines 2024-2044” is essential reading for materials and subsystem suppliers and investors and it has much to interest product integrators, equipment manufacturers, and others in the 6G supply chain.

pressat

Company Contact:

_

Zhar Research

E. anastasiams@zharresearch.com
W. https://www.zharresearch.com/

Additional Contact(s):
Dr Peter Harrop
peterharrop@zharresearch.com

View Online

Additional Assets:

Newsroom: Visit our Newsroom for all the latest stories:
https://www.zhar-research.pressat.co.uk