UNIVERSITY OF MINNESOTA
Driven to Discover℠

Apparatus and method for tuning the permittivity of ultrahigh dielectric constant materials in an RF coil for MR imaging

Tunable ultrahigh dielectric constant ceramics to significantly improve RF coil efficiency, detection sensitivity, and imaging signal-to-noise ratio in magnetic resonance systems

IP Status: US Patent Issued #11,275,132

Applications

- Diagnostic medicine
- Clinical research

Technology Overview

Magnetic Resonance (MR) imaging and spectroscopy play crucial roles in modern clinical diagnoses and research. At the same time, MR system performance is limited by several critical factors, one is low signal-to-noise ratio (SNR), which is critical to produce high quality diagnostic images. To address this issue and improve system performance, researchers from the University of Minnesota have developed an ultrahigh dielectric constant ceramic material to be used in conjunction with RF coils in MR systems. This ultrahigh dielectric material allows for varying permittivity at different operating frequencies. The advantages of this technology include denoising effect, high RF coil transmission & reception efficiencies, and improved SNR for magnetic resonance or spectroscopic imaging applications. This novel technology is robust and cost-effective and could largely improve imaging sensitivity and resolution, which is critical for biomedical research and clinical diagnostics.

Phase of Development

TRL: 3-5
A prototype has been developed and tested in vitro and in vivo.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

Please contact our office to share your business' needs and learn more.

Researchers

- Wei Chen, PhD Professor, Department of Radiology
- Xiao-Hong Zhu, PhD Associate Professor, Department of Radiology

References

Technology ID
2019-105

Category
Engineering & Physical Sciences/Design Specifications
Engineering & Physical Sciences/Materials
Engineering & Physical Sciences/MRI & Spectroscopy

Learn more

1. Chen, Wei, Byeong-Yeul Lee, Xiao-Hong Zhu, Hannes M. Wiesner, Maryam Sarkarat, Navid P. Gandji, Sebastian Rupprecht, Qing X. Yang, and Michael T. Lanagan(2020) , https://doi.org/10.1109/TMI.2020.2988834, IEEE transactions on medical imaging