

For future chips, smaller must also be better

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The explosion of portable communication devices that we enjoy today -- such as cell and smart phones, Bluetooth hands-free units, and wireless Internet networks -- has resulted in part from the development of a wide variety of integrated circuits that create, process and receive the microwave frequencies on which the communication is based.

Continuing demand for higher performance over a wider range of frequencies has shrunk the physical size of circuits and fueled the development of new materials in thin-film forms, tested in detail over the entire microwave spectrum (1-50GHz).

In the August 9 edition of the technical journal [Applied Physics Letters](#), published by the American Institute of Physics, two teams of researchers from China and France report success in making and testing tiny high-frequency capacitors made from a complex manmade mineral: barium strontium titanate (BST).

By introducing an ultrathin (1.2 nanometer) [titanium oxide](#) seed layer, the researchers made thin BST films that exhibited excellent microwave properties up to 40 GHz.

"Our recent achievements certainly pave the way for realizing high-frequency microwave applications using thin-film BST capacitors," said Prof. Xianlin Dong from the Shanghai Institute of Ceramics, Chinese Academy of Sciences.

More information: The article, "Microwave properties of epitaxial

(111)-oriented Ba_{0.6}Sr_{0.4}TiO₃ thin films on Al₂O₃ (0001) up to 40 GHz" by Lihui Yang, Freddy Ponchel, Genshui Wang, Denis Remiens, Jean francois Legier, Daniel Chateigner, and Xianlin Dong appears in the journal *Applied Physics Letters*.

Provided by American Institute of Physics

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