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 Ba0.6Sr0.4TiO3 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*.

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