

## Improved Flux Pinning Properties of MOCVD-Based REBCO Superconductors through Nb-Doping

### **Disclosure Number**

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### **Technology Summary**

In 2008, chemical doping with Zr, resulted in the formation of nanoscale columns of self-assembled BaZrO<sub>3</sub> (BZO) nanodots aligned perpendicular to the ab-plane or parallel to the c-axis of the REBCO superconductor [Ref. 1]. With this modification a significant increase in the performance of the HTS wire was obtained when the field is applied parallel to the c-axis of the superconductor. However, to realize the self-assembly of BZO nanodots into columnar defects within the MOCVD REBCO films, growth rates had to be reduced more than 50% and deposition temperatures had to be significantly increased above the normal growth temperatures. Hence, in this invention, we have identified Niobium (Nb) that may provide improved pinning properties comparable to Zr-modified films through self assembly without sacrificing the above mentioned deposition parameters. In this invention, we have considered Nb as a potential candidate for such performance improvements of MOCVD REBCO films. The Nb additions into the MOCVD-REBCO films are currently underway at ORNL.

### **Inventor**

AYTUG, TOLGA

Chemical Sciences Division

### **Licensing Contact**

CALDWELL, JENNIFER T

UT-Battelle, LLC

Oak Ridge National Laboratory

Rm 137, Bldg 4500N, MS: 6196

1 Bethel Valley Road

Oak Ridge, TN 37831

Office Phone: (865) 574-4180

E-mail: [CALDWELLJT@ORNL.GOV](mailto:CALDWELLJT@ORNL.GOV)

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