FAST BOLOMETRIC RESPONSE OF BULK $La_{0.7}Sr_{0.3}MnO_3$ ELECTROCERAMICS

Yu.M. Nikolaenko[1], **I.S. Maksimov**[1], **Yu.V. Medvedev**[1], **A.N. Ulyanov**[1], **A.M. Grishin**[2]

[1]Donetsk Physical-Technical Institute of the National Academy of Sciences of Ukraine, 72 R.Luxemburg, Donetsk, 340114, Ukraine

[2]Departament of Condensed Matter Physics, Royal Institute of Technology, S-100 44, Stockholm, Sweden

9.7 cm

We report on the performance of a microwave electroceramic bolometer (MECB) of hybrid $La_{0.7}Sr_{0.3}MnO_3/Al_2O_3$ (0.224 mm^3) structure. The estimated thermal resistance of the ceramic manganate - single crystal sapphire interface is about 500 K/W at room temperature. This resistance is the main thermal barrier in the heat sink system and has been found to be slightly dependent on the temperature. When compared with high-T_C superconducting bolometers, $La_{0.7}Sr_{0.3}MnO_3$ MECB works in a wide temperature range 77 K to 330 K excluding the narrow temperature interval at the metal-dielectric phase transition ($T = 230$ K). The MECB sensitivity and time constant at room temperature have been found to be 0.1 V/W and 100 ms correspondingly.

To improve bolometer performance the point contact $La_{0.7}Sr_{0.3}MnO_3$ MECB has been fabricated by break-junction technique. The optimization of MECB design brought to considerable improvement of basic bolometer characteristics. Point contact MECB exhibits linear I-V characteristic, microwave sensitivity was about 0.3 V/W and time constant was less than 100 ns.

13.4 cm

Subject category :

4. Rare Earths and Actinides, Alloys and Compounds

Presentation mode :
poster

Corresponding author :
Igor Maksimov

Address for correspondence :
Donetsk Physical and Technical Institute of NASU
72, str. R.Luxemburg
340114 Donetsk
Ukraine
FAX: (0622) 55-74-62

Email address :
maksimov@kinetic.ac.donetsk.ua