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A TUNABLE VIBRATORY MICROGYROSCOPE, YONG SOO OH, BYEUNG LEUL LEE and CIMOO SONG (Micro Systems Lab. Samsung Advanced Institute of Technology (SAIT), San 14-1 Nongseo-ri, Kiheung-up, Yongin-si, Kyunggi-do 449-900, Korea)

A comb driving vibratory micro-gyroscope which utilizes electrically tunable resonant modes, and a hermetically sealed vacuum package that houses the gyroscope and the interface electronics have been developed and analyzed. The dimension of the package is 14 × 7 × 2.5mm, and the pressure inside package is about 50mTorr and the measured Q-factor is between 10^3 and 10^4. Surface micromachining technology was used to fabricate vibratory gyroscope with a vibrating part of 400×600 μm using a 6 mask process and the poly-silicon structural layer(6.5 μm thickness) was deposited by LPCVD at 625℃. In this study, we propose a new designed micro-gyroscope with fold-beam structure and is designed to be driven in a parallel to the substrate by electrostatic forces and subjects to the Coriolis force along vertical axis. In this scheme, we can adjust the resonant frequency by applying inter-plate DC voltage after fabrication to tune the vibrating modes for higher sensitivity. Increasing the Q factor of the resonator of the micro-gyroscope has a desirable effect for increasing the sensitivity and also improving the resolution because the reduced driving voltage acts as a smaller noise source. We've accomplished in vacuum-sealing the resonator in Al_2O_3 ceramic package by means of the localized resistive heating method. The gyroscope was tested on the rotational rate table in a condition of 50Hz resonant frequencies split and driving voltage of AC 200mV_{pk} with DC 2V. The characteristics of the gyroscope are 0.1deg/sec resolution, 50Hz bandwidth, and ±100 deg/sec dynamic range. This gyroscope can be used not only rugged application like camcoder vibration control and 3D mouse, but also micro inertial measurement unit for car navigation.

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SURFACE ACOUSTIC WAVE PROPERTIES OF DIAMONDLIKE CARBON THIN FILMS, JIN YONG KIM, H. J. KIM(School of Mater. Sci. & Eng., Seoul National Univ., Seoul 151-742, Korea), H. M. CHO, H. K. YANG, and J. C. PARK(Korea Electronics Technology Institute, KyungGi-Do 451-860, Korea)

Surface acoustic wave devices have been more important as mobile telecommunication system needs high-frequency and down-sized components. Higher frequency SAW devices can be more easily realized by development of new high SAW velocity material. ZnO/diamond/Si multilayer is one of the most promising materials for GHz band SAW filters because of their high SAW velocity above 10,000 m/sec. Physical properties of DLC films were comparable with those of diamond, so that those films are considered to have a potential for application to SAW filters.

In this study, SAW characteristics of DLC thin films deposited on Si(100) were investigated. To examine their SAW properties, 1-port SAW resonators and transversal uniform IDT-type SAW filters were fabricated. Dependence of the film properties on deposition conditions was also investigated.

P-059

A STUDY OF PROCESSING VARIABLES, MICROSTRUCTURE AND PROPERTIES OF BSCCO SUPERCONDUCTOR TAPE, BONG KI JI, TAE WOO KIM, JOONG SEOK KIM, JEONG HO KIM AND JINHO JOO(School of Metal. & Mat. Sci. Eng., Sung Kyun Kwan Univ. Suwon, 440-746, Korea), NO-JIN PARK(School of Metal. & Mat. Sci. Eng., Kumoh Nat. Univ. of Tech., Kumi, 730-701, Korea)

We evaluated the effect of processing variables on microstructure and resultant critical current density(J_c) of Ag sheathed BSCCO superconductor tape. The degree of interface irregularity of tapes packed by CIP method was more reduced, compared to that of tape by ram method. In addition, the degree of interface irregularity was promoted with decreasing the dimension of tape during forming process. As the dimensions of wire/tape were changed form diameter of 3.25 mm to thickness of 0.25 mm, J_c values were observed to be increased by 10 times. It was likely that the improvement of J_c was mainly result from the enhanced texturing of 2223 grain, 2223 content and density of superconductor core, etc. Specifically, the effect of degree of texture on J_c was evaluated by using pole figure technique and its result will be discussed.

P-060

MgO Doping Effects on Properties of $LiNbO_3$ Single Crystals, Chong-Don KIM, G. T. JOO and J. S. Lee(Ceramic Div. KIST, P.O. Box 131, Cheongryang, Seoul 130-650,Korea) and B. K. Rhee (Dept. of Physics. Sogang Univ., Seoul 121-742, Korea) and H. G. KIM (Dept. of Materials Science and Engineering, KAIST, Daejon, 305-701, Korea)

MgO (1, 2, 4 and 6 mole% respectively)-doped $LiNbO_3$ single crystals were grown by CZ method in order to investigate the structural properties with the dielectric and optical properties. Structure refinements were conducted on samples after poling with the help of four-circle X-ray diffraction. 2 mole% MgO-doped $LiNbO_3$ has highest tilt angle of Megaw model and 4 mole% MgO-doped $LiNbO_3$ has largest cation displacement in NbO_6 octahedral site among above samples.

Curie temperature increase with MgO content until 4 mole% and then decrease at 6 mole%. The phase matching temperature have same results as Curie temperature.

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