

# マテリアル先端リサーチインフラ利用報告書

## ARIM User's Report

【Release : 2025.06.10】    【Update : 2025.04.15】

### 課題データ / Project Data

課題番号 Project Issue Number	24TU0143
利用課題名 Title	振動型マイクロデバイス/Micro Vibration device fabrication
利用した実施機関 Support Institute	東北大学 / Tohoku Univ.
機関外・機関内の利用 External or Internal Use	外部利用/External Use
横断技術領域 Cross-Technology Area	加工・デバイスプロセス/Nanofabrication 計測・分析/Advanced Characterization
重要技術領域 Important Technology Area	高度なデバイス機能の発現を可能とするマテリアル/Materials allowing high-level device functions to be performed
キーワード Keywords	ダイシング/ Dicing, 高周波デバイス/ High frequency device, 電子顕微鏡/ Electronic microscope, リソグラフィ/ Lithography, MEMS/NEMSデバイス/ MEMS/NEMS device, スパッタリング/ Sputtering, 光リソグラフィ/ Photolithgraphy

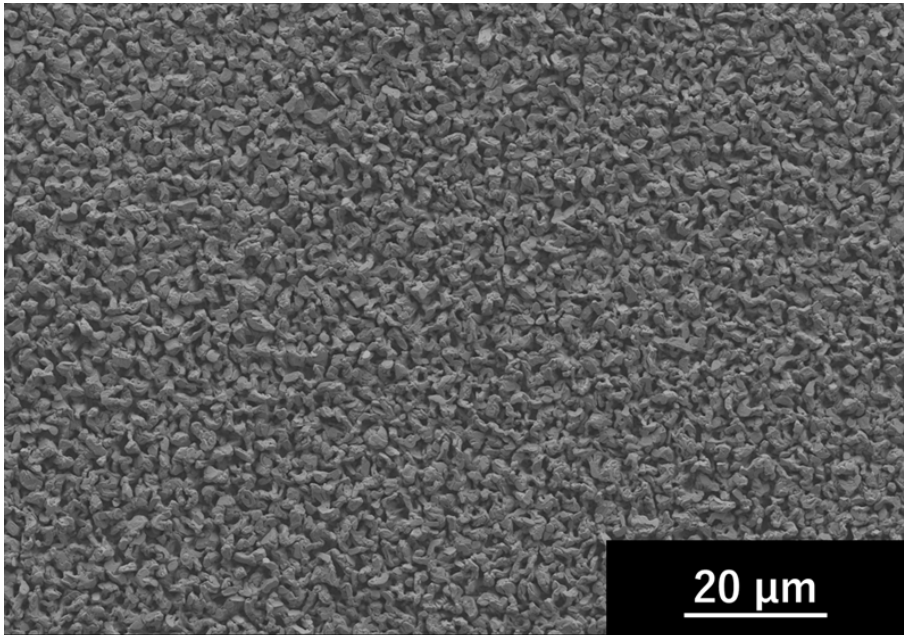
### 利用者と利用形態 / User and Support Type

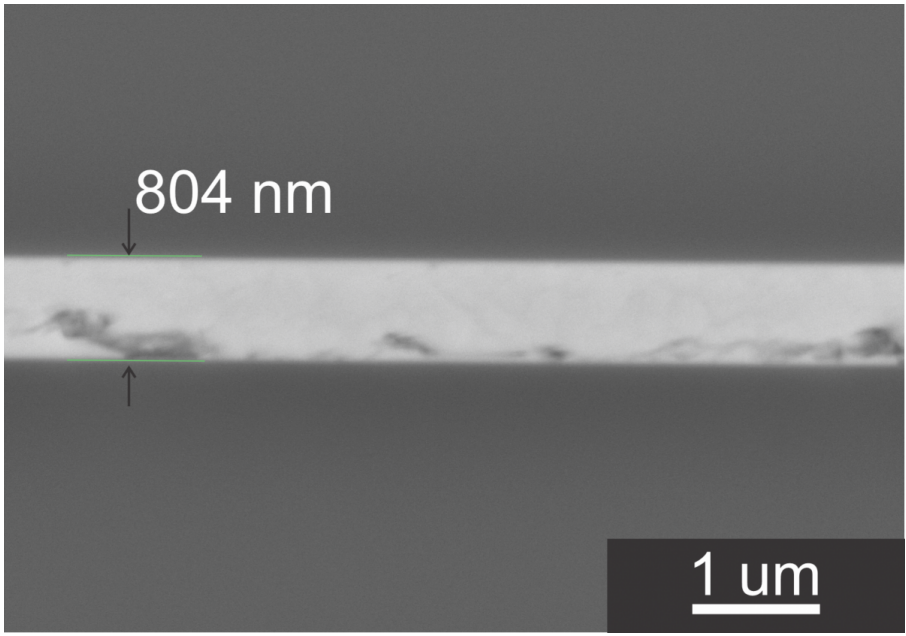
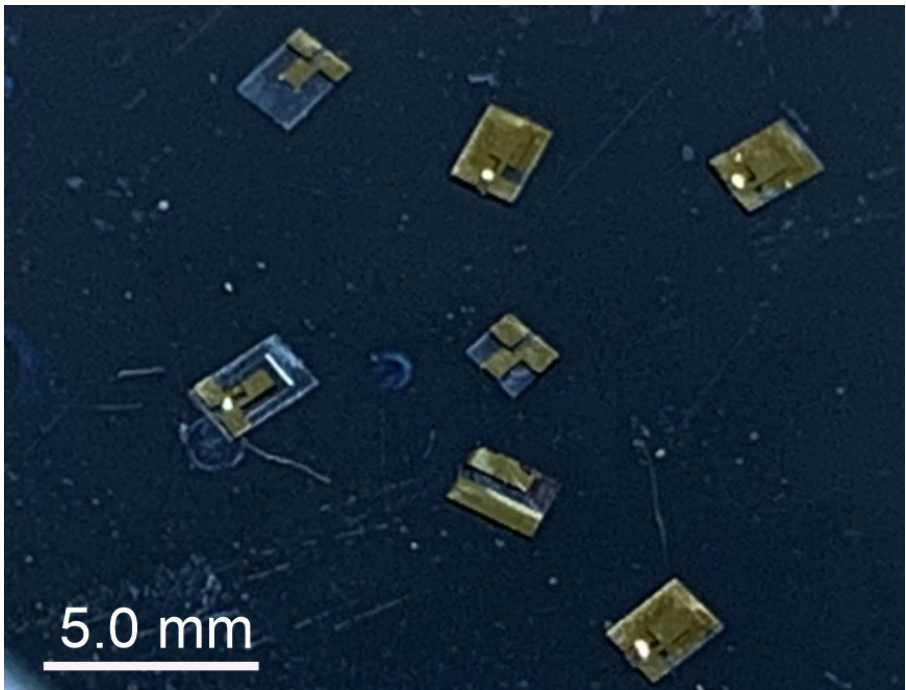
利用者名（課題申請者） User Name (Project Applicant)	NGUYEN HOANGHUNG
所属名 Affiliation	NextQM Japan 合同会社
共同利用者氏名 Names of Collaborators Excluding Supporters in the Hub and Spoke Institutes	
ARIM実施機関支援担当者 Names of Supporters in the Hub and Spoke Institutes	
利用形態 Support Type	機器利用/Equipment Utilization

### 利用した主な設備 / Equipment Used in This Project

利用した主な設備 Equipment ID & Name	TU-158 : 芝浦スパッタ装置（加熱型） TU-160 : 自動搬送 芝浦スパッタ装置（加熱型） TU-251 : SUSS ウェハ接合装置 TU-326 : Zygo Nexview TU-255 : ディスコ ダイサ
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報告書データ / Report

概要（目的・用途・実施内容） Abstract (Aim, Use Applications and Contents)	<p>This report summarizes the usage of MEMS fabrication equipment, including the sputter machine, dicer, microscope, and lithography tools, for the fabrication of a MEMS-based vibration device. The fabrication process was carried out successfully, and the overall results were satisfactory.</p>
実験 Experimental	<p>The MEMS vibration device was fabricated using the following steps:</p> <ol style="list-style-type: none"><li><b>Thin Film Deposition (Sputtering):</b> A metal layer was deposited onto the substrate using a sputter machine to form the conductive layer required for the device's operation.</li><li><b>Lithography:</b> Photoresist was spin-coated, exposed, and developed to define the electrode pattern.</li><li><b>Etching:</b> Unwanted material was removed using wet or dry etching techniques to create the functional MEMS structure.</li><li><b>Dicing:</b> The wafer was diced into individual devices with high precision to maintain structural integrity.</li><li><b>Inspection and Characterization:</b> The fabricated devices were inspected under a microscope to ensure structural accuracy and quality.</li></ol>
結果と考察 Results and Discussion	<p><b>Sputter Machine:</b> The deposition process was stable, achieving uniform thin films with good adhesion and dense thickness, which is crucial for the device's functional layers (Fig. 1; 2)</p> <p><b>Microscope:</b> Inspection confirmed the devices shape, which is essential for device performance.</p> <p><b>Dicer:</b> The dicing process was precise, with minimal chipping and good edge quality, ensuring proper device dimensions. (Figure 3)</p> <p><b>Lithography:</b> Pattern transfer was successful, with well-defined features and no significant defects, maintaining accuracy for MEMS vibration components.</p>
図・表・数式 1 Figures, Tables and Equations 1	<div></div> <p>Figure 1. Surface of sputtered thin film</p>

<p>図・表・数式 2 Figures, Tables and Equations 2</p>	 <p>Figure 2. Cross-section of the sputtered thinfilm</p>
<p>図・表・数式 3 Figures, Tables and Equations 3</p>	 <p>Figure 3. Diced chip using dicer</p>
<p>その他・特記事項（参考文献・謝辞等） Remarks(References and Acknowledgements)</p>	<p>All equipment performed within expected parameters. No major issues were encountered, and the fabricated MEMS vibration device met the desired specifications. Regular maintenance and calibration are recommended to ensure continued performance and reproducibility in future fabrication processes.</p>

## 成果発表・成果利用 / Publication and Patents

<p>DOI（論文・プロシーディング） DOI (Publication and Proceedings)</p>	
<p>口頭発表、ポスター発表 および、その他の論文 Oral Presentations etc.</p>	

特許出願件数 Number of Patent Applications	0件
特許登録件数 Number of Registered Patents	0件