

Correlating Wafer Saw Dicing Parameters with Residual Strain in Microelectronic-Grade Silicon Wafers: Raman Spectroscopic Analysis

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Supervisors:

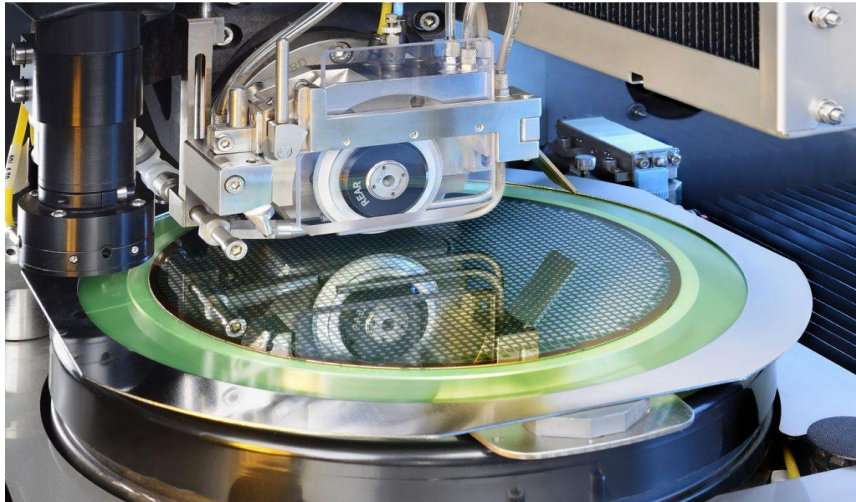
Dr. Jörg Debus – TU Dortmund, Prof. Dr. Hannes Kurtze – HS Anhalt

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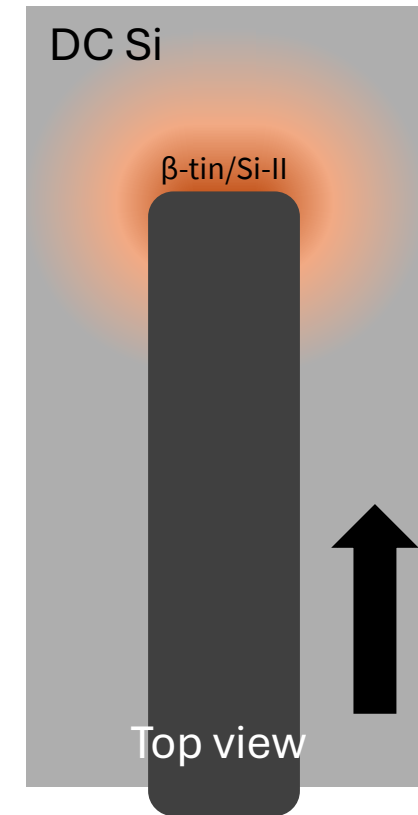
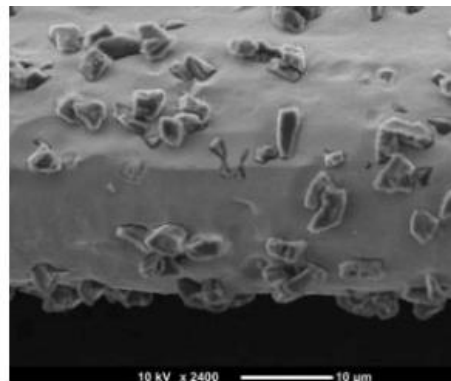
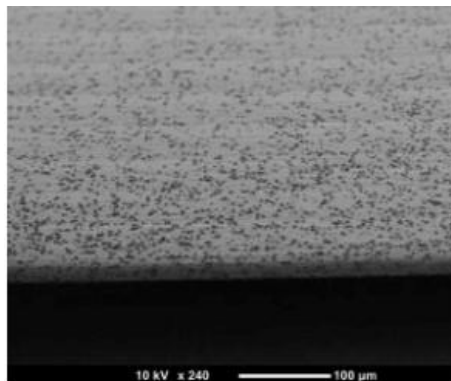
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1. Introduction



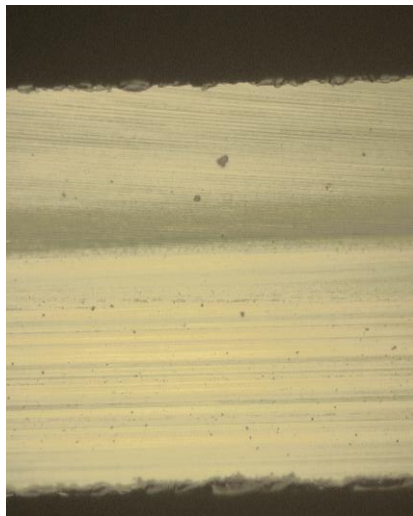
- ✓ Fast
- ✓ Cost effective
- Damage at micro scale



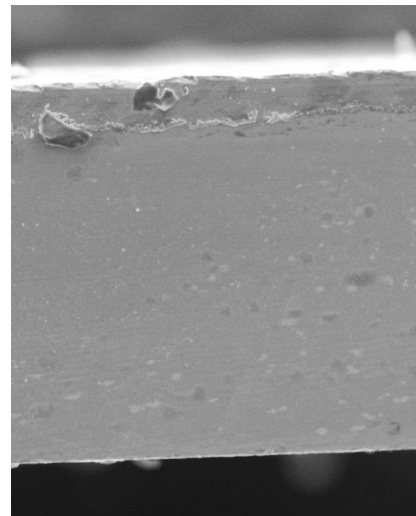
Phase transformations due to processing.

2. Motivation

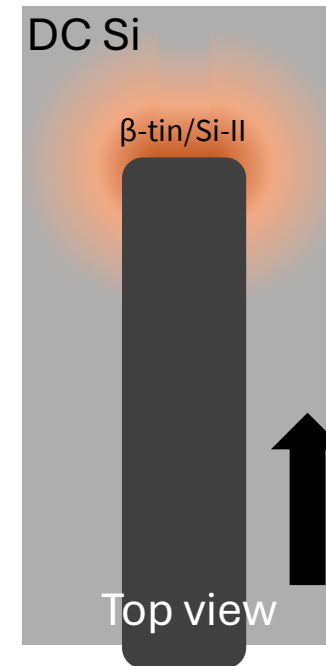
Inspection



Optical 50x

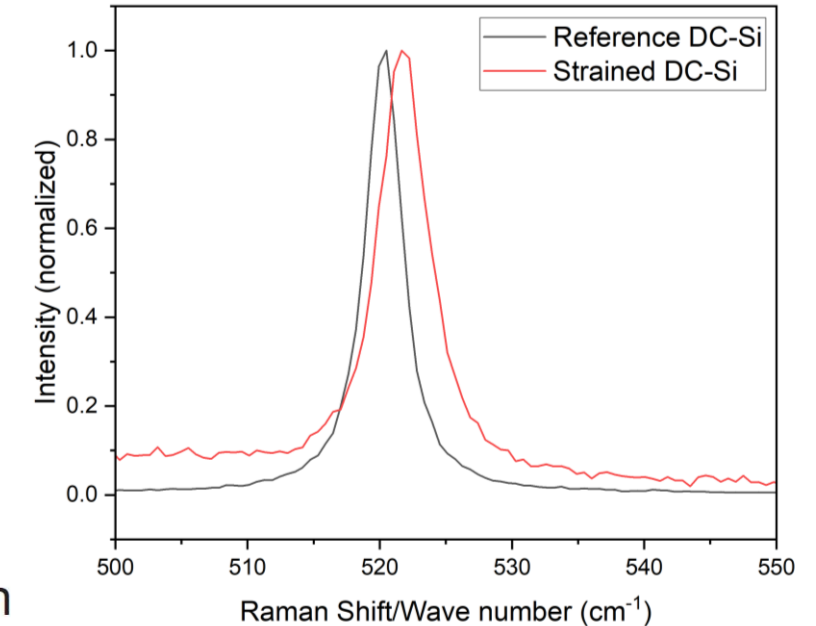
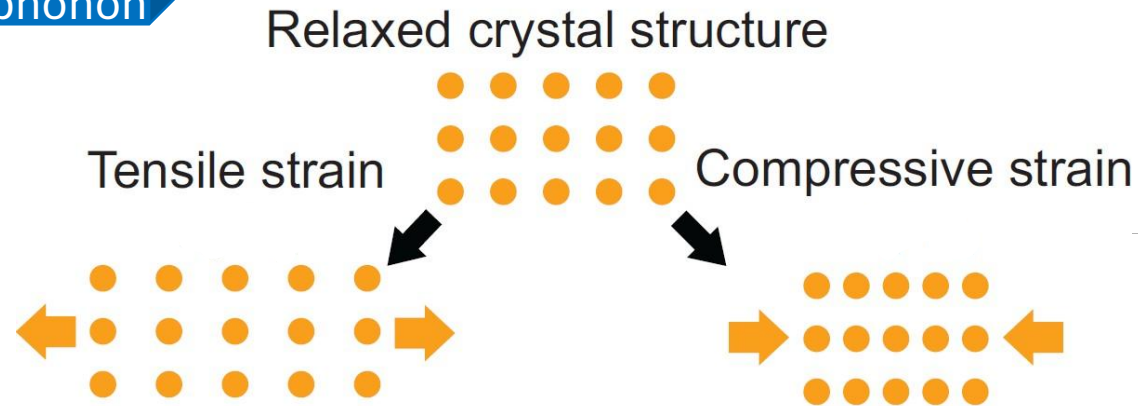
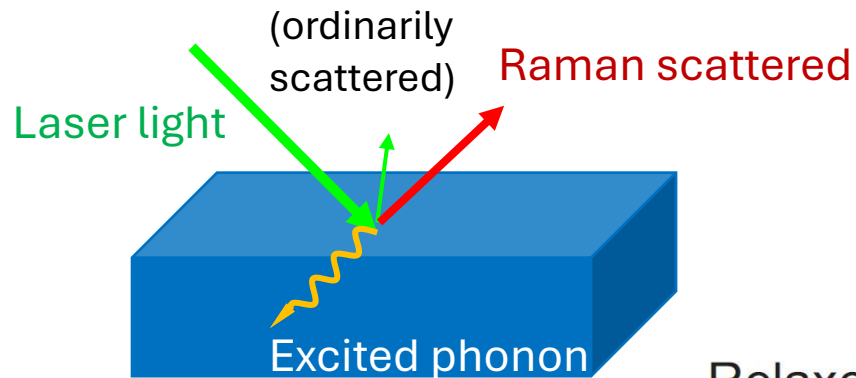


SEM



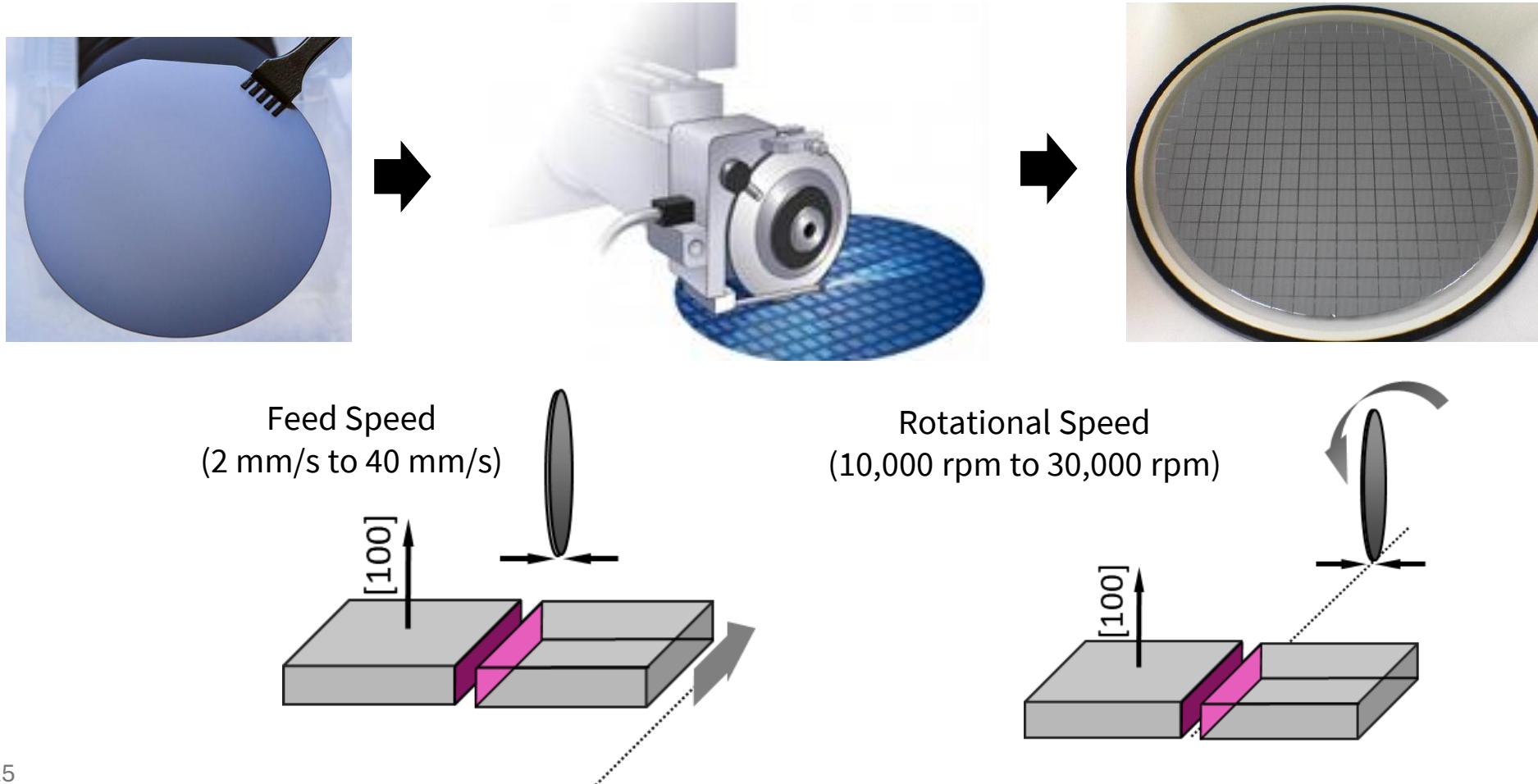
How to detect the residual strain?

3. Objective

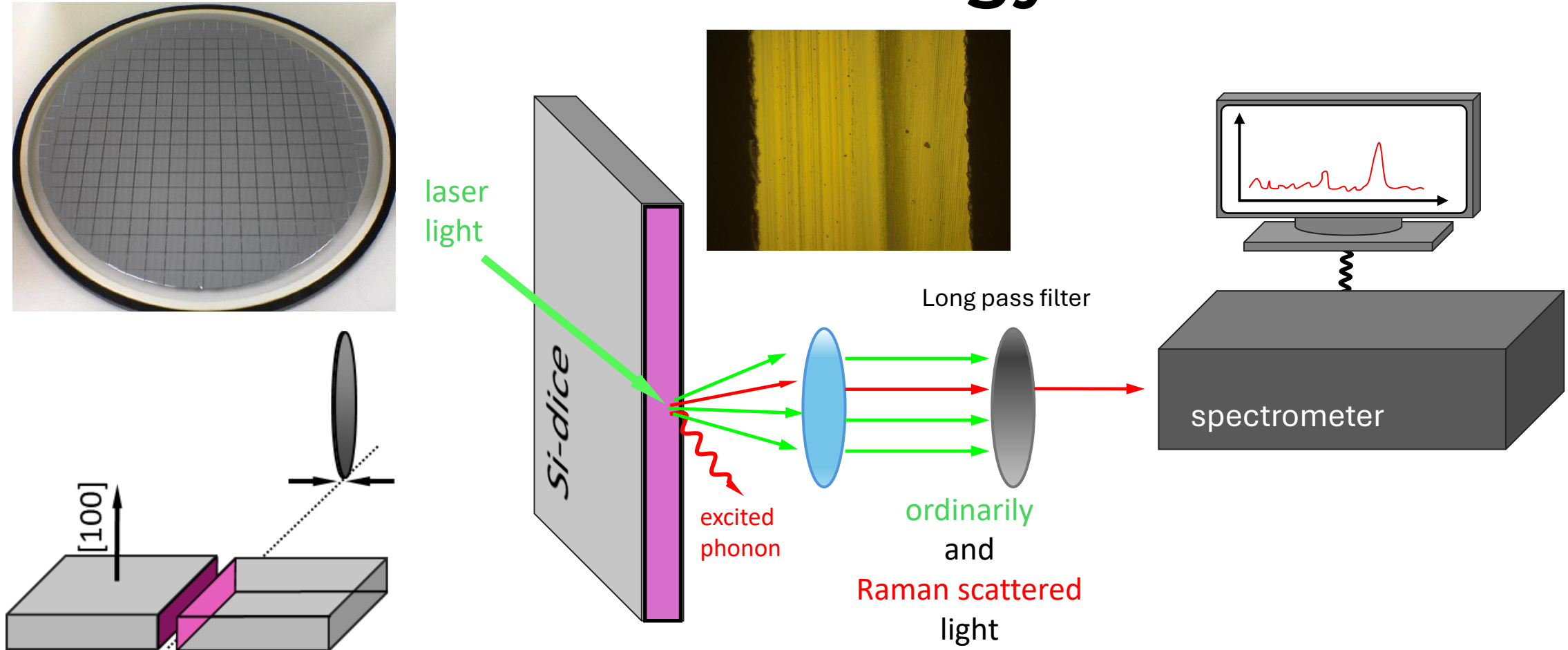


Raman spectroscopy is strain sensitive.

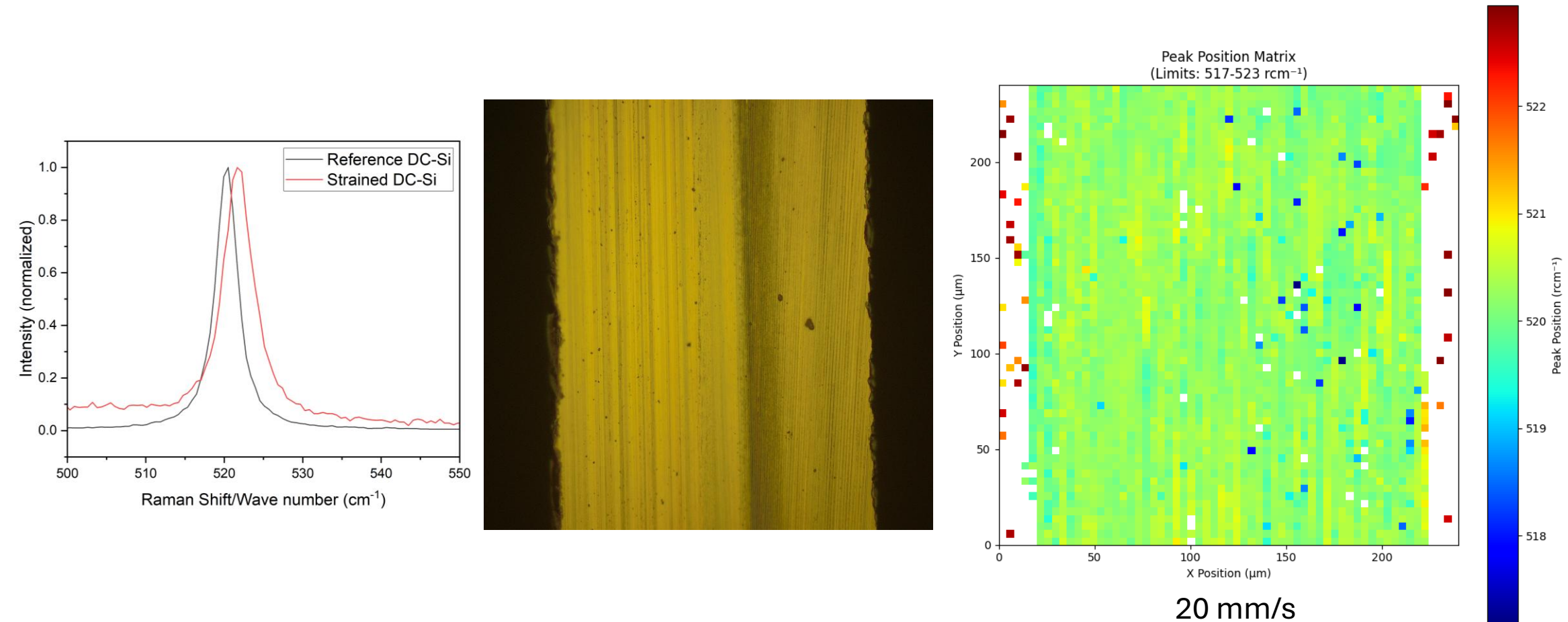
4. Methodology



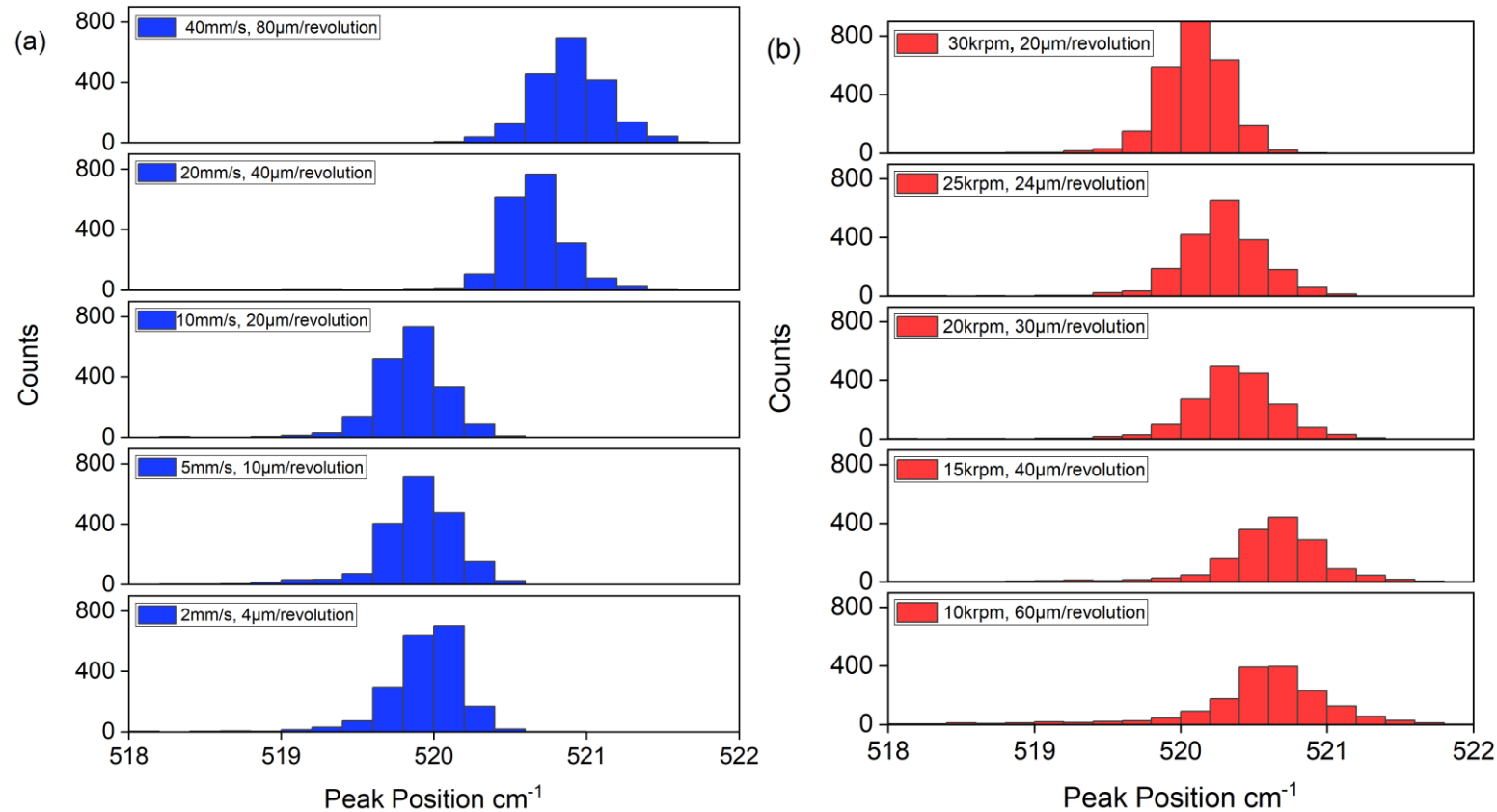
4. Methodology



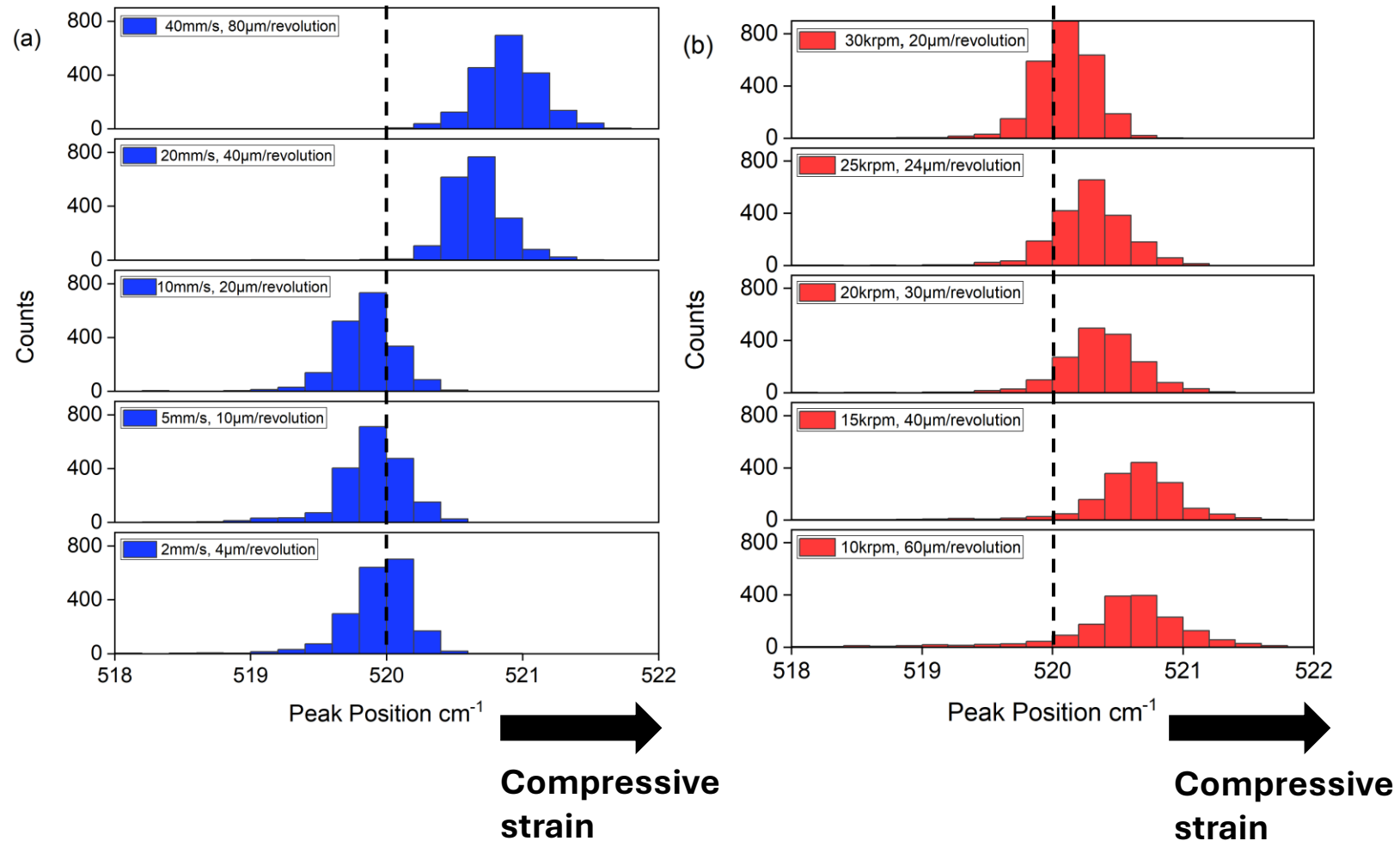
5. Results & Discussion



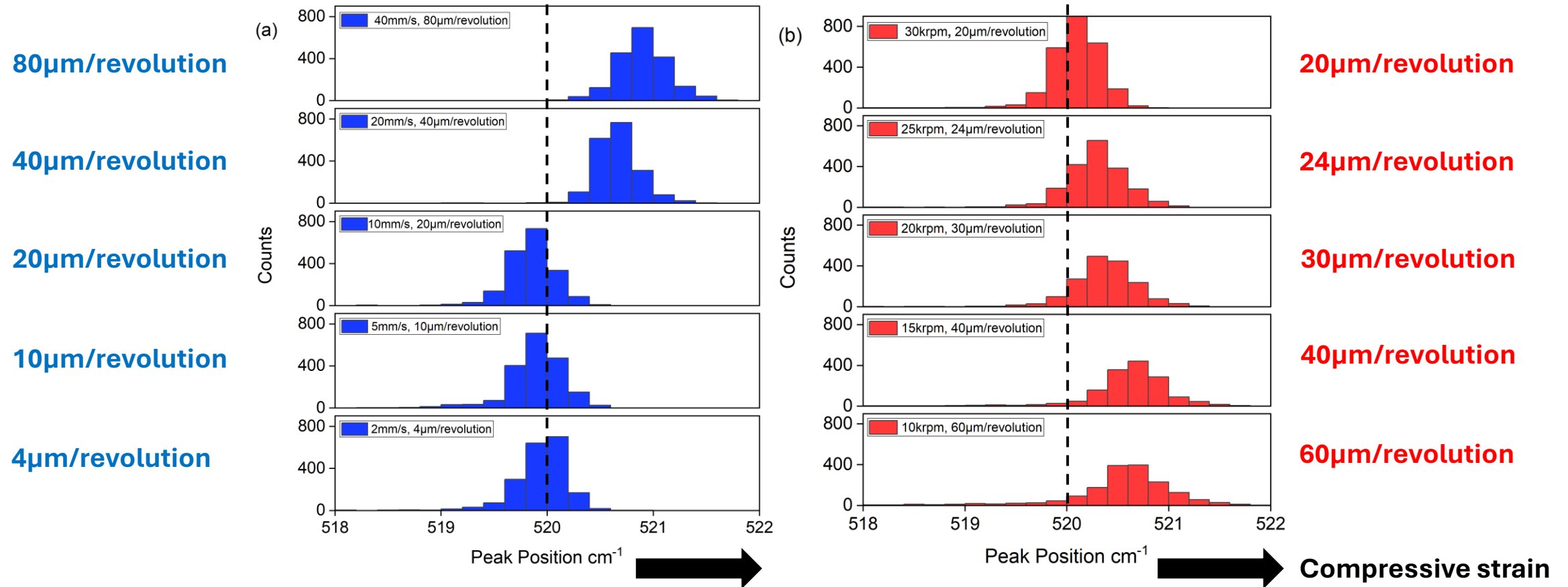
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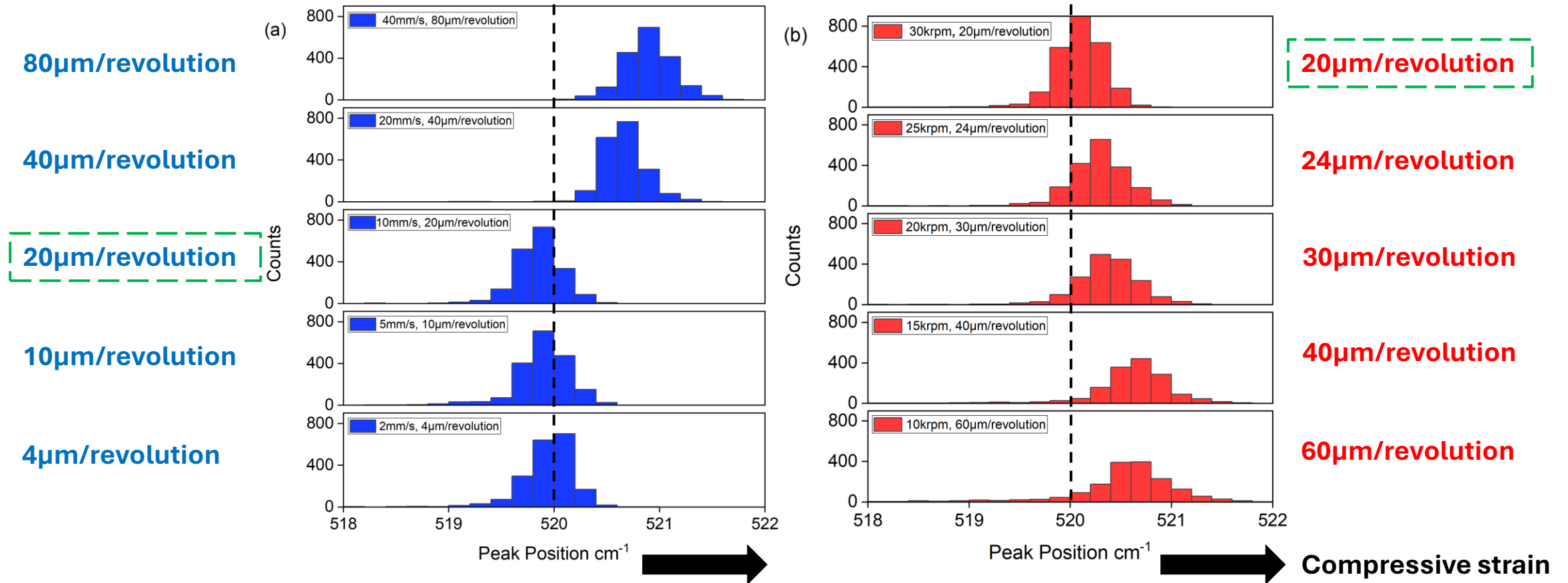


5. Results & Discussion

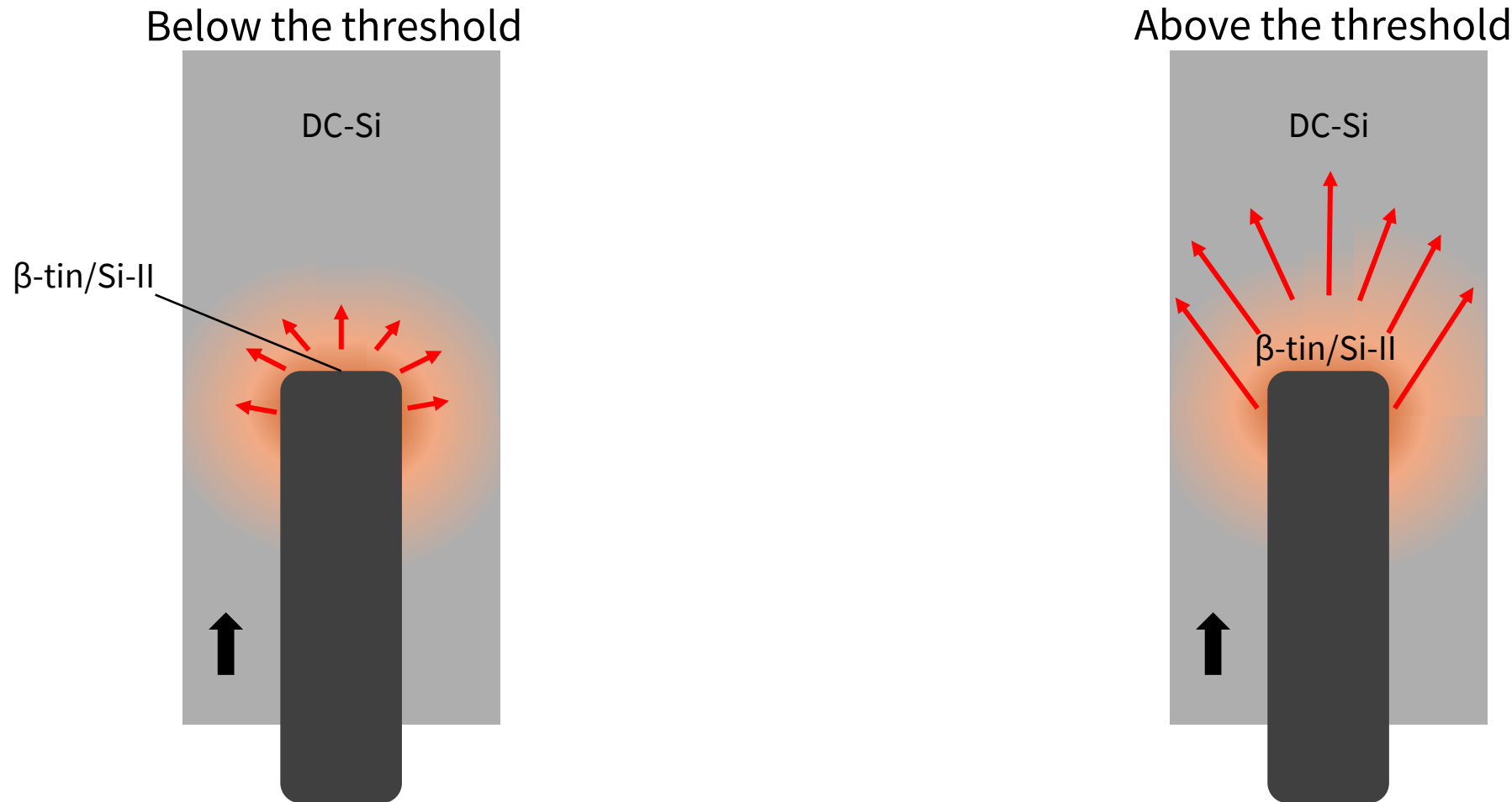


Feed rate = distance covered by the wafer per blade revolution
Minimum to no residual strain around 20-25 $\mu\text{m}/\text{revolution}$

5. Results & Discussion



6. Conclusion



7. Future Work

1. In-depth investigation of the underlying physics governing phase transformations and residual strain in silicon chips.
2. Evaluation of alternative dicing technologies, such as thermal laser separation (TLS) and scribe-and-break methods.

Thank you for your attention

Any Questions?



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