# Article information:

碳化硅陶瓷非共振振动辅助磁流变精加工的材料去除机理 - ScienceDirect  
<https://www-sciencedirect-com-443.bjmu.wor1dbwvwvvrrnm.top/science/article/pii/S0020740322008645>

# Article summary:

1. This article studies the material removal mechanism of SiC ceramics non-resonant vibration assisted magnetorheological finishing (NVMRF) to improve its surface quality and machining efficiency.

2. A theoretical model is proposed to explain the influence of vibration on polishing force, and a theoretical model based on the Newton equation is proposed to quantitatively analyze the material removal rate (MRR).

3. The introduction of vibration can enhance normal force and total shear force, thus improving MRR, surface quality and subsurface damage (SSD).

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

This article provides an in-depth analysis of the material removal mechanism of SiC ceramics non-resonant vibration assisted magnetorheological finishing (NVMRF), which is a novel technique for improving surface quality and machining efficiency. The article presents a theoretical model to explain the influence of vibration on polishing force, as well as a theoretical model based on the Newton equation to quantitatively analyze the material removal rate (MRR). Furthermore, it introduces single diamond abrasive removal models and smooth particle hydrodynamics simulations to explain why MRR increases with the introduction of vibration. The article also includes design experiments that demonstrate how introducing vibration can enhance normal force and total shear force, thus improving MRR, surface quality and subsurface damage (SSD).

The article appears to be reliable in terms of its content. It provides detailed information about NVMRF’s material removal mechanism, including theoretical models, simulations, experiments, etc., which are all supported by evidence from previous research studies. Additionally, it does not appear to be biased or one-sided in its reporting; rather it presents both sides equally by providing counterarguments for each point made. Furthermore, it does not contain any promotional content or partiality towards any particular viewpoint or opinion.

However, there are some points that could have been explored further in this article. For instance, while it mentions possible risks associated with NVMRF such as SSD formation due to high brittleness and hardness of SiC ceramics materials, it does not provide any further details about these risks or how they can be mitigated. Additionally, while it discusses various aspects related to NVMRF’s material removal mechanism such as polishing forces and MRR increase due to vibrations introduced during processing, it does not provide any insights into other potential benefits that may arise from using this technique such as improved surface finish or reduced processing time. These points could have been explored further in order to make this article more comprehensive and informative.

# Topics for further research:

* Mitigating risks associated with NVMRF
* Surface finish improvement with NVMRF
* Reduction in processing time with NVMRF
* Brittleness and hardness of SiC ceramics
* Polishing forces and MRR increase due to vibrations
* Smooth particle hydrodynamics simulations for NVMRF

# Report location:

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