# Article information:

Is the hardness of material harder than diamond reliable? - ScienceDirect  
<https://www.sciencedirect.com/science/article/pii/S1005030222008295>

# Article summary:

1. A reliable criterion for hardness testing is needed to understand the true nature of hardness, especially for superhard materials.

2. The hardness of a testing sample is overestimated when the hardness of the indenter is close to or lower than that of the sample.

3. When the indenter material is at least 18.2% harder than the testing sample, the measured hardness value agrees with that obtained from a genuine diamond indenter on the same material at the same load.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article "Is the hardness of material harder than diamond reliable?" discusses the challenges in accurately measuring the hardness of superhard materials, which are materials that have been reported to be harder than diamond. The article highlights the importance of developing a systematic and reliable criterion for hardness testing, which is crucial in understanding the true nature of hardness and determining the applications of these materials.

The article presents a study where the Vickers diamond indenter and substitute indenters with the same shape were used to measure the hardness of nine ceramics and superhard materials within well-defined criteria and methodology. The findings suggest that when the indenter material is at least 18.2% harder than the testing sample, the measured hardness value agrees with that obtained from a genuine diamond indenter on the same material at the same load.

While this study provides valuable insights into evaluating new and emerging superhard materials, there are some potential biases and limitations in this article. Firstly, it is important to note that this study only considers a limited number of materials, and therefore, its findings may not be applicable to all superhard materials. Additionally, while this study suggests that using an indenter material that is at least 18.2% harder than the testing sample can lead to accurate measurements, it does not provide any evidence or explanation for why this threshold exists.

Furthermore, while this article acknowledges some uncertainties in measuring hardness values for materials harder than diamond due to possible permanent plastic deformation or damage of N-D indenter after conducting a test, it does not explore potential solutions or alternative methods for addressing these issues.

Overall, while this article provides useful insights into evaluating new and emerging superhard materials' hardness values, it is important to consider its limitations and potential biases when interpreting its findings. Further research is needed to develop more comprehensive criteria for accurately measuring hardness values for all types of superhard materials.

# Topics for further research:

* Alternative methods for measuring hardness values of superhard materials
* Permanent plastic deformation in N-D indenters during hardness testing
* Factors affecting the accuracy of hardness measurements
* Applications of superhard materials in industry
* Comparison of different types of indenters for hardness testing
* Limitations of Vickers diamond indenter for measuring hardness values

# Report location:

<https://www.fullpicture.app/item/1a5ea49bda7d8d529d18712578c2d3a2>