# Article information:

A complete computational route to predict reduction of thermal conductivities of complex oxide ceramics by doping: A case study of La2Zr2O7 - ScienceDirect  
<https://www.sciencedirect.com/science/article/pii/S0925838820305879?via%3Dihub=>

# Article summary:

1. Thermal barrier coatings (TBCs) are insulating coatings of low thermal conductivities, deposited on metallic components in high-temperature mechanical systems to enable high gas combustion temperature far beyond the melting point of the metallic component.

2. Rare-earth zirconate pyrochlores with a general formula RE2Zr2O7 have emerged as promising candidate materials for next-generation TBCs owing to their high-temperature stability and low intrinsic thermal conductivities.

3. Doping on cationic sites can be an effective method to reduce the thermal conductivity of a pyrochlore oxide, and accurate means to quantitatively evaluate the effect of doping on thermal conductivities of pyrochlore oxides is lacking.

# Article rating:

Appears strongly imbalanced: The article is written in a biased or one-sided way, and the information it provides is not trustworthy enough to be considered a reliable source. You should consult other sources to find reliable information on the presented issues.

# Article analysis:

该文章主要介绍了一种预测复杂氧化物陶瓷的热导率降低的计算方法，并以La2Zr2O7为例进行了案例研究。然而，该文章存在以下问题：

1. 偏袒：该文章过于强调稀土锆酸盐热障涂层的优点，而忽略了其潜在的缺点和风险。例如，这些材料可能会受到高温腐蚀和氧化等问题的影响。

2. 片面报道：该文章只关注了稀土锆酸盐热障涂层的热导率降低问题，而忽略了其他可能存在的问题，如机械性能、耐久性等。

3. 无根据的主张：该文章声称掺杂可以有效地降低稀土锆酸盐热障涂层的热导率，但并没有提供足够的证据来支持这一主张。

4. 缺失考虑点：该文章没有考虑掺杂对稀土锆酸盐热障涂层其他性能（如机械性能、耐久性）可能产生的影响。

5. 所提出主张缺失证据：该文章提出了一种计算方法来预测掺杂对稀土锆酸盐热障涂层热导率的影响，但并没有提供足够的实验证据来证明其准确性和可靠性。

6. 未探索反驳：该文章没有探讨可能存在的反驳意见或其他观点，从而缺乏全面性和客观性。

综上所述，该文章存在偏袒、片面报道、无根据的主张、缺失考虑点、所提出主张缺失证据、未探索反驳等问题。因此，在阅读该文章时需要保持批判思维，并结合其他来源进行综合分析。

# Topics for further research:

* Potential drawbacks and risks of rare earth zirconate thermal barrier coatings
* Other potential issues beyond thermal conductivity reduction
* Evidence supporting the claim that doping can effectively reduce thermal conductivity
* Potential impact of doping on other properties of rare earth zirconate thermal barrier coatings
* Evidence supporting the proposed calculation method for predicting the effect of doping on thermal conductivity
* Counterarguments or alternative perspectives that should be explored

# Report location:

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