# Article information:

Air-stable, high contrast solution-phase electrochromic device based on an A-D-A viologen derivative - ScienceDirect  
<https://www.sciencedirect.com/science/article/abs/pii/S1572665719307155?via%3Dihub=>

# Article summary:

1. Electrochromic devices (ECDs) are in high demand for their reversible changes in optical properties upon electrical stimulus, and solution-phase ECDs have advantages such as self-bleaching and simple device structures.

2. Viologens, specifically the radical cation species, are widely used as electrochromic materials due to their high optical contrast and solubility in solutions or gels. A novel viologen derivative (DPB) was synthesized with an A-D-A structure that stabilized the radical cation and resulted in a bathochromic shift.

3. Phosphate groups were introduced into viologens to potentially contribute to electron transfer and stabilize radicals, while lithium bis(trifluoromethanesulphonyl)imide (TFSI) was selected as counter anions for improved solubility and ionic conductivity. Ferrocene was chosen as the complementary material for its good solubility, low operating voltage, and chemical stability. The DPB-based ECD demonstrated excellent electrochromic properties even in normal air conditions.

# 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:

由于本文是一篇科学论文，其内容主要涉及到材料的合成和电化学性能的测试。因此，本文并没有明显的偏见或宣传内容。然而，在文章中存在一些缺失的考虑点和未探索的反驳。

首先，文章没有提及该新型viologen衍生物与其他已知viologen衍生物相比具有何种优势。虽然作者提到了该衍生物具有较高的稳定性和较窄的带隙，但并没有对这些特性进行详细讨论或与其他类似材料进行比较。

其次，文章没有探讨该解决方案相对于其他类型的ECDs（如固态设备）的优缺点。虽然作者提到了溶液相ECD具有自漂白优势、简单结构、节能等特点，但并没有对这些特点进行深入分析或与其他类型设备进行比较。

此外，文章也没有探讨该解决方案可能存在的风险或限制。例如，作者并未提及该解决方案在实际应用中可能遇到的耐久性问题、环境适应性问题等。

最后，尽管本文是一篇科学论文，但仍存在可能片面报道或缺失证据的情况。例如，作者提到了其他研究中使用磷酸盐基固定viologen的情况，但并没有提供这种方法在该解决方案中的优点或缺点。此外，文章也没有提供详细的实验数据或分析结果来支持其主张。

总之，虽然本文是一篇科学论文，但仍存在一些缺失的考虑点和未探索的反驳。为了更全面地评估该解决方案的优缺点和潜在风险，需要进一步深入研究和分析。

# Topics for further research:

* Advantages of the new viologen derivative compared to other viologen derivatives
* Comparison of solution-phase ECDs with other types of ECDs
* Potential risks or limitations of the proposed solution
* Durability and environmental adaptability issues in practical applications
* Advantages and disadvantages of using phosphate-based fixation of viologen
* Detailed experimental data and analysis results to support the claims made in the article

# Report location:

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