

## 2D Nanomaterials-Based Geopolymer as-Self-Sensing Buildings in Construction Industry

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**Abstract :** The self-sensing capability opens up new possibilities for structural health monitoring, offering real-time information on the condition and performance of constructions. The synthesis and characterization of these functional 2D material geopolymers will be explored in this study. Various fabrication techniques, including mixing, dispersion, and coating methods, will be employed to ensure uniform distribution and integration of the 2D materials within the geopolymers. The resulting composite materials will be evaluated for their mechanical strength, electrical conductivity, and sensing capabilities through rigorous testing and analysis. The potential applications of these self-sensing geopolymers are vast. They can be used in infrastructure projects, such as bridges, tunnels, and buildings, to provide continuous monitoring and early detection of structural damage or degradation. This proactive approach to maintenance and safety can significantly improve the lifespan and efficiency of constructions, ultimately reducing maintenance costs and enhancing overall sustainability. In conclusion, the development of functional 2D material geopolymers as self-sensing materials presents an exciting advancement in the construction industry. By integrating these innovative materials into structures, we can create a new generation of intelligent, self-monitoring constructions that can adapt and respond to their environment.

**Keywords :** 2D materials, geopolymers, electrical properties, self-sensing

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