Versatile Perforated MXene for Enhanced Water Purification

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Perforated MXene, a novel variant of the two-dimensional (2D) transition metal carbide, has emerged as a promising material for water purification [1]. This work explores the unique properties and potential applications of perforated MXene in water purification. By introducing controlled perforations into the MXene structure, researchers have significantly enhanced its surface area and porosity. This increased surface area-to-volume ratio allows for more efficient adsorption and filtration of contaminants from water. Additionally, the perforations can be tailored to specific applications, enabling selective removal of various pollutants. This review summarizes the methods used to fabricate perforated MXene and the factors influencing its performance. It also highlights the potential advantages of perforated MXene over traditional MXene in terms of adsorption capacity, filtration rate, and selectivity. Applications of perforated MXene in water purification include the removal of heavy metals, dyes, organic pollutants, and even salts for desalination [2]. The ability to selectively target specific contaminants makes perforated MXene a valuable tool for addressing complex water quality issues. In conclusion, perforated MXene represents a significant advancement in water purification technology. Its unique properties and versatility offer promising solutions to the challenges posed by water scarcity and pollution. Further research and development in this area are expected to lead to even more innovative and effective applications of perforated MXene in water treatment.

References

[1] H. Zhang, L. Wang, C. Chen, and X. Hou, *Environmental Science: Nano*, 7 (2020) 2978-2992.
[2] L. Huang, Li Ding, J. Caro, H. Wang, *Angew. Chem*. *Int. Ed.* (2023), 62, e202311138

Figures

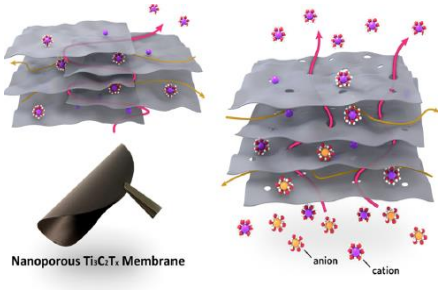

Figure 1: Mxene-based Nanoporous Membrane with in-plane porosity