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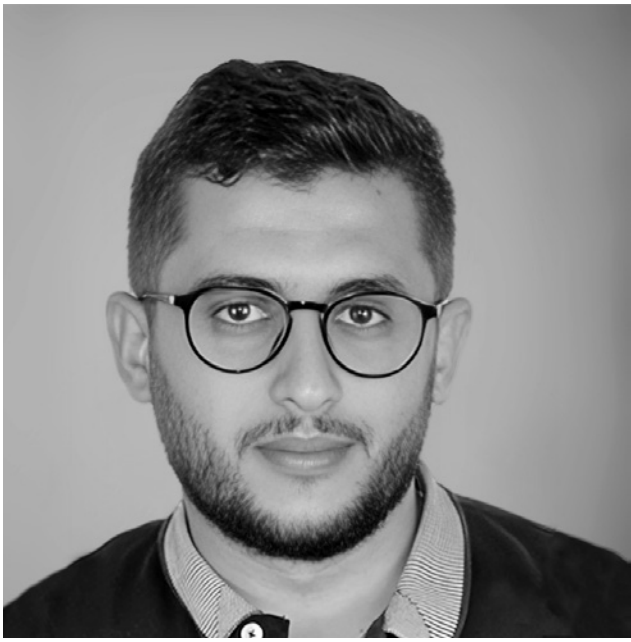

Research field

**Porous physisorbent materials**

PhD title

## 2D framework materials for water production and treatment: Water desalination as a case study


**Summary**

North Africa is confronting a severe water scarcity crisis driven by its arid weather, climate change, population growth, and the excessive consumption of water. Water desalination, particularly through reverse osmosis, presents a viable solution to this challenge. However, current membrane materials used in reverse osmosis are not ideal because they exhibit sensitivity to temperature and limited resistance to oxidants.

This research aims to develop more efficient materials for reverse osmosis membranes using advanced 2D metal- and nonmetal-organic frameworks. By improving existing 2D framework materials and developing new ones, the goal is to produce membranes with the right pore sizes and hydrophilic properties to effectively reject salt while allowing water to pass through quickly. Additionally, these new membranes will be designed to be more durable and chemically stable, enhancing their performance and making desalination more efficient and sustainable for North Africa. This approach seeks to provide an alternative or a complementary solution to address the region's critical water shortage.



**Keywords**

- Nanoporous adsorbents
- 2D framework materials
- Water treatment
- Desalination



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