

Faculté des Sciences Appliquées de Béni Mellal Centre d'Études Doctorales « Sciences Pluridisciplinaires »

Avis de soutenance d'une thèse de doctorat

Le Doyen par intérim de la Faculté des Sciences Appliquées de Béni Mellal porte à la connaissance du public que **M. Amine MIFTAH** soutiendra une thèse de doctorat intitulée : **Développement des charbons actifs et activateurs à partir de la biomasse pour la capture de CO₂ : utilisation des huiles de pyrolyse comme des activateurs.**

La soutenance publique aura lieu **le jeudi 15 octobre 2026 à 10h au Pôle d'Etudes Doctorales**, devant le jury composé de :

Présidente	Pr. Latifa BOUISSANE	PES	Université Sultan Moulay Slimane, Béni Mellal, Maroc
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Articles publiés

1. **Amine Miftah**, Leila Azaryouh, Zineb Ouahouah, Soumaya Basaoud, Khalifa El Harfi, Adil Aboulkas, Production and Optimization of High-Performance Activated Hydrochar from Sawdust: A Two-Step Conversion Route for Enhanced Methylene Blue Adsorption. *Chemistry Africa* 9, 81 (2026).
<https://doi.org/10.1007/s42250-026-01612-0>.
2. **Amine Miftah**, Zineb Ouahouah, Soumaya Basaoud, Leila Azaryouh, Khalifa El Harfi, Adil Aboulkas, Thermokinetic Approach to Alfa Fiber Pyrolysis: Thermal Behavior, Reaction Kinetics, Thermodynamics, and Product Characterization. *Reaction Kinetics, Mechanisms and Catalysis* 139, 2051–2077 (2026).
<https://doi.org/10.1007/s11144-026-03062-8>.
3. Leila Azaryouh, Mehdi Mennani, **Amine Miftah**, Khalifa El Harfi, Mounir El Achaby, Adil Aboulkas, Zineb Kassab, Advance and Integrated Treatment Methods of Emerging Contaminants In: Gupta, H., Madhav, S., Dhiman, S., Mishra, R. (eds) *Emerging Contaminants in Water and Wastewater. Environmental Science and Engineering*. Springer, Cham.
https://doi.org/10.1007/978-3-031-82579-8_12.
4. Oumayma Belyazid, **Amine Miftah**, Abdellatif Barakat, Khalifa El Harfi, Adil Aboulkas, Valorization of Moroccan macroalgae wastes in hydrochar production: parameter evaluation and energetic properties, *Biomass Convers. Biorefinery* (2025). <https://doi.org/10.1007/s13399-025-06665-8>.
5. Leila Azaryouh, Zineb Kassab, Mohamed Jaouahar, **Amine Miftah**, Khalifa El Harfi, Mounir El Achaby, Adil Aboulkas, Integral valorization of two-phase olive mill waste: extraction of cellulose and lignin and their characterization, *Euro-Mediterranean J. Environ. Integr.* 9 (2024) 513–522.
<https://doi.org/10.1007/s41207-024-00521-3>.

ABSTRACT

This thesis focuses on the development of biomass-derived carbon materials for environmental applications, particularly CO₂ capture and the removal of organic pollutants from aqueous media. In response to increasing environmental challenges and the need for sustainable carbon resources, lignocellulosic biomass was explored as a renewable precursor for producing hydrochar and activated carbon materials. Hydrothermal carbonization was first optimized to obtain hydrochar under controlled operating conditions, which was subsequently used as a precursor for chemical activation to produce porous carbon materials with enhanced adsorption properties. In addition, hydrochar produced under optimal conditions was further modified through a phosphorylation treatment, resulting in a marked improvement in adsorption performance toward pharmaceutical compounds. Another key aspect of this work is the investigation of the hydrothermal carbonization aqueous phase as a sustainable alternative for washing and pretreatment, replacing conventional acidic reagents such as hydrochloric and acetic acids, while also influencing the final properties and adsorption behavior of the activated carbon. Furthermore, a comparative study was conducted to evaluate the influence of different preparation routes on the resulting carbon materials and their adsorption performance. The results demonstrate that the preparation pathway plays a decisive role in governing surface reactivity, porosity development, and overall adsorption efficiency. In particular, it is shown that a material optimized for one application does not necessarily exhibit superior performance for another, highlighting the importance of tailoring synthesis strategies to specific environmental targets. Overall, this work contributes to the development of sustainable biomass valorization routes for advanced carbon materials aimed at environmental remediation and gas capture applications.

Keywords: Biomass, Activated carbon, Wastewater treatment, CO₂ capture, Hydrothermal carbonization, Pyrolysis, environmental remediation