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Editorial

Special Issue on Functional Materials in Water and Wastewater Treatment/Soil Remediation

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Material science is an interdisciplinary research field that includes interrelationships between the composition, structure, process, and performance of various materials and is widely integrated with other disciplines to form many interdisciplinary subjects. Recently, as a new field of material science, environmental materials have attracted significant attention. The application of functional environmental materials, both natural and synthetic, is becoming increasingly popular in water purification and soil remediation. With rapid industrial development and accelerated urbanization, environmental pollution has been worsening, and conventional treatment technologies often cannot satisfy the growing public demand for a healthy environment. Therefore, it is necessary to develop efficient and economic technologies for large-scale water and soil treatment. One way of achieving this is through the application of functional environmental materials; this is expected to greatly enhance the efficiency of traditional treatment processes, thereby facilitating improvements in water and soil quality. This Special Issue aimed to collect the latest research on various functional environmental materials for water/wastewater treatment and soil remediation.

A total of 10 papers on various functional environmental materials for water/wastewater treatment and soil remediation, including biochar, activated carbon, iron hydroxide, and ion-exchange resins, are presented in this Special Issue. Quansah et al. [1] assessed the applicability of nascent rice husk as an adsorbent to remove cationic dyes from textile wastewater. Choi et al. [2] demonstrated the performance of a hybrid ion-exchange fabric/ceramic membrane system to simultaneously treat metal ions and turbidity in synthetic wastewater.

The removal rate of As(V) and Zn(II) by the ceramic membrane increased with the solution's pH, while turbidity was completely removed regardless of the solution's pH level. Kyi et al. [3] explored the adsorption potential of biochar derived from palm kernel shells as an affordable adsorbent for the removal of crystal violet from wastewater. Kim et al. [4] assessed the effects of irrigation with desalinated water on the growth of lettuce (*Lactuca sativa* L.) in a greenhouse in South Korea. Aung et al. [5] reported the removal of Cu(II) from aqueous solutions using amine-doped polyacrylonitrile fibers. Sun et al. [6] investigated the effect of the functional group density of anion-exchange resins on the removal of p-toluene sulfonic acid from an aqueous solution. Hwang et al. [7] reported how arsenic leaches from different soil and sediment types and responds to hydrologic conditions to identify areas susceptible to arsenic contamination. Another article by Kim et al. [8] reported the application of alginate-coated iron hydroxide for the removal of Cu(II) and phosphate. Puszkarewicz and Kaleta [9] presented research on the adsorptive properties of activated carbon for the removal of chromium (VI) from a water solution. Sun et al. [10] also reported the synthesis of a weakly basic polyacrylic anion exchanger, D311, via N-alkylation with 1-bromopropane to effectively remove nitrate from an aqueous solution.

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We hope that these findings will provide new inspiration for the application of functional environmental materials for water/wastewater treatment and soil remediation.

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References

1. Quansah, J.O.; Hlaing, T.; Lyonga, F.N.; Kyi, P.P.; Hong, S.-H.; Lee, C.-G.; Park, S.-J. Nascent rice husk as an adsorbent for removing cationic dyes from textile wastewater. *Appl. Sci.* **2020**, *10*, 3437. [CrossRef]
2. Choi, N.-C.; Cho, K.-H.; Kim, M.-S.; Park, S.-J.; Lee, C.-G. A Hybrid Ion-Exchange Fabric/Ceramic Membrane System to Remove As(V), Zn(II), and Turbidity from Wastewater. *Appl. Sci.* **2020**, *10*, 2414. [CrossRef]
3. Kyi, P.P.; Quansah, J.O.; Lee, C.-G.; Moon, J.-K.; Park, S.-J. The removal of crystal violet from textile wastewater using palm kernel shell-derived biochar. *Appl. Sci.* **2020**, *10*, 2251. [CrossRef]
4. Kim, H.; Kim, S.; Jeon, J.; Jeong, H. Effects of Irrigation with Desalinated Water on Lettuce Grown under Greenhouse in South Korea. *Appl. Sci.* **2020**, *10*, 2207. [CrossRef]
5. Aung, K.T.; Hong, S.-H.; Park, S.-J.; Lee, C.-G. Removal of Cu(II) from Aqueous Solutions Using Amine-Doped Polyacrylonitrile Fibers. *Appl. Sci.* **2020**, *10*, 1738. [CrossRef]
6. Sun, Y.; Li, X.; Zheng, W.; Ding, X.; Singh, R.P. Effect of Functional Group Density of Anion Exchange Resins on Removal of p-Toluene Sulfonic Acid from Aqueous Solution. *Appl. Sci.* **2020**, *10*, 1. [CrossRef]
7. Hwang, S.; Her, Y.; Jun, S.M.; Song, J.-H.; Lee, G.; Kang, M. Characteristics of Arsenic Leached from Sediments: Agricultural Implications of Abandoned Mines. *Appl. Sci.* **2019**, *9*, 4628. [CrossRef]
8. Kim, H.-G.; He, F.; An, B. The Application of Alginate Coated Iron Hydroxide for the Removal of Cu(II) and Phosphate. *Appl. Sci.* **2019**, *9*, 3835. [CrossRef]
9. Puszkarewicz, A.; Kaleta, J. Chromium (VI) Adsorption on Modified Activated Carbons. *Appl. Sci.* **2019**, *9*, 3549. [CrossRef]
10. Sun, Y.; Zheng, W.; Ding, X.; Singh, R.P. Adsorption of Nitrate by a Novel Polyacrylic Anion Exchange Resin from Water with Dissolved Organic Matters: Batch and Column Study. *Appl. Sci.* **2019**, *9*, 3077. [CrossRef]