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**Enhanced Adsorption Removal of Antibiotics from Aqueous
Solutions by Modified Alginate/Graphene Double Network Porous
Hydrogel**

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Abstract: Alginate/graphene double network hydrogel has recently been demonstrated as a promising adsorbent for water pollutants. To improve the adsorption capacity of the double network hydrogel, physical and chemical modifications are made to obtain an excellent porous structure and more functional groups. As-modified alginate/graphene double network hydrogel has a higher hydroxyl group content under a higher polyvinyl alcohol content and a higher carboxyl group content with a higher oxidation degree. Moreover, the CO₂ produced by CaCO₃ is used as pore formation agent avoiding the use of toxic organic matters. The modified alginate/graphene double network hydrogel shows a higher specific surface area, a larger mean pore diameter, and a higher pore volume with a higher initial CaCO₃. In antibiotics adsorption, the mechanistic understanding shows that hydrogen bonds have greater influence on adsorption than carboxyl groups. The results reported here pave the way for the use of the alginate/graphene double network hydrogel for water treatment.

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