



**Environmental  
Science**  
Processes & Impacts

**Abiotic Reduction of 3-Nitro-1,2,4-triazol-5-one (NTO) and  
Other Munitions Constituents by Wood-Derived Biochar  
through Its Rechargeable Electron Storage Capacity**

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### **Environmental Significance Statement**

In addition to being an adsorbent for contaminants, black carbon such as biochar can store and transfer electrons to promote abiotic degradation of munitions compounds such as NTO, DNAN, and RDX. Moreover, the electron storage capacity of black carbon is regenerable and can be used to degrade contaminants via repeated redox cycles. These findings suggest that (1) black carbon may impact the fate and transport of contaminants in natural environments and in engineered systems through multiple mechanisms (i.e., sorption and redox transformation), and (2) plant-based biochar can be a renewable reductant and adsorbent for pollution control and remediation.