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Modified sequential extraction for biochar and petroleum coke: metal release potential and its environmental implications

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1 **Modified sequential extraction for biochar and petroleum coke:**  
2 **metal release potential and its environmental implications**

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11 **Abstract**

12 A modified Community Bureau of Reference (CBR) sequential extraction method was tested to  
13 assess the composition of untreated pyrogenic carbon (biochar) and oil sands petroleum coke. Wood  
14 biochar samples were found to contain lower concentrations of metals, but had higher fractions of  
15 easily mobilized alkaline earth and transition metals. Sewage sludge biochar was determined to be  
16 less recalcitrant and had higher total metal concentrations, with most of the metals found in the more  
17 resilient extraction fractions (oxidizable, residual). Petroleum coke was the most stable material, with  
18 a similar metal distribution pattern as the sewage sludge biochar. The applied sequential extraction  
19 method represents a suitable technique to recover metals from these materials, and is a valuable tool  
20 in understanding the metal retaining and leaching capability of various biochar types and  
21 carbonaceous petroleum coke samples.

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