

Accepted Manuscript

Electrochemical stripping of cotton fabrics dyed with Reactive Black 5 in water and wastewater

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PII: S0045-6535(18)30771-9

DOI: [10.1016/j.chemosphere.2018.04.122](https://doi.org/10.1016/j.chemosphere.2018.04.122)

Reference: CHEM 21270

To appear in: *ECSN*

Received Date: 31 January 2018

Revised Date: 8 April 2018

Accepted Date: 19 April 2018

Please cite this article as: Ma, X., Wang, X., Yin, X., Kan, X., Wang, Z., Electrochemical stripping of cotton fabrics dyed with Reactive Black 5 in water and wastewater, *Chemosphere* (2018), doi: 10.1016/j.chemosphere.2018.04.122.

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1 **Electrochemical stripping of cotton fabrics dyed with Reactive Black**
2 **5 in water and wastewater**

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6 **Abstract:** Cotton fabrics dyed with Reactive Black 5 (RB5) was electrochemically
7 stripped using Ti/TiO₂-RuO₂-IrO₂ anode in water, pyridine and phenol solution. The
8 results showed that RB5 dye could be easily stripped from the surface of cotton
9 fabrics through the cleavage of chromophoric group (-N=N-) under the attack of
10 hydroxyl radicals (\cdot OH) and active chlorines generated *in situ*. Efficient stripping
11 performance could be obtained in water and pyridine solution, whilst the stripping
12 percent was not obviously affected by pyridine concentration and layers of dyed
13 cotton fabrics. Whereas, phenol existing in water slowed the stripping rate due to the
14 competition between the stripping of RB5 dye and the degradation of phenol. In the
15 case of multi-layer dyed cotton fabrics, the stripping performance of the inner layer is
16 superior to that of the outer layer owing to that the cotton fabrics hinder the diffusion
17 of active chlorines and \cdot OH. The FTIR analysis of stripped cotton fabrics showed that
18 the effect of electrochemical process and the existence of pollutant in water on the
19 stripped cotton fabrics could be negligible. Electrochemical oxidation could also
20 successfully strip various dyes from waste cotton fabrics in the investigated stripping
21 solutions. Therefore, electrochemical oxidation provides an environmental friendly

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