Electrochemical investigation of symmetric aminoquinones

Janine Maier[1,2], Reyhan Yagmur[1,2], Dominik Wickenhauser[1,2], Anne-Marie Kelterer[3], Ana Torvisco[4], Stefan Spirk[1,2,]
[1]*Institute of Bioproducts and Paper Technology, Graz University of Technology, Inffeldgasse 23, 8010 Graz, Austria*
[2]*Ecolyte GmbH, Inffeldgasse 21B, 8010 Graz, Austria*
[3]*Institute of Physical and Theoretical Chemistry, Stremayrgasse 9/I, 8010 Graz, Austria*
[4]*Institute of Inorganic Chemistry Graz, University of Technology, Stremayrgasse 9/IV, 8010 Graz, Austria*
stefan.spirk@tugraz.at

Quinones have a wide range of valuable properties and potential applications in medicinal chemistry, materials science, optoelectronic devices, and batteries.[1] Molecular redesign using different functional groups, like amines, can optimize their properties and prevent unwanted side reactions. However, particularly the synthesis of aminoquinones can be challenging at times, and there is a need for simple and efficient routes to access these compounds without metal catalysts or halogenated starting materials.[2] Here, we demonstrate the synthesis and electrochemical characterization of a series of aminoquinones derived from renewable sources, namely vanillin or 2-methoxyhydroquinone.[3] We employ a series of primary and secondary amines, varying in their electronic situation as well as steric demand. Depending on the type of starting material, either the desired aminoquinone or the related Schiff-base adduct was obtained. The aminoquinones were further explored for their stability at different pH values. At extreme pH values, the deeply colored aminoquinones decompose, accompanied by decolorization of the solutions within a few minutes (pH 14) or hours (pH 1). At intermediate pH values (3-8) the aminoquinones are stable upon storage in solution, where they feature a quasi-reversible redox chemistry and fast, diffusion limited kinetics.[4]

Figure 1. Redox reaction of symmetric aminoquinones

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