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Systematic Detection of Chromium Species on the Surface of Solid Materials: Leather

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Systematic Detection of Chromium Species on the Surface of Solid Materials: Leather

By: Ekrupe Kaur

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Leather making is an ancient art that has been used for over 7000 years. Tanning leather has always been an integral part of creating wearable leather. About 90% of leather tanning is done using basic chromium sulfate (CrSO_4OH) because it is cost-efficient and readily available. The problem is that Cr(III) from the tanning agent can oxidize to Cr(VI) at high temperature and pH, and low humidity. Cr(VI) is corrosive, toxic, and a carcinogen that can permeate skin and oxidize DNA. My research focuses on method development and systematic detection of Cr(VI) on the surface using X-ray Photoelectron Spectroscopy (XPS). Good method development of Cr(VI) surface analysis will help to better estimate and ultimately reduce the amount of Cr(VI) released from leather. In addition, systematic detection of chromium in its stable oxidation states (Cr(VI) and Cr(III)) will aid in chemical speciation and analysis of future projects.