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Additive free MXene inks in printed electronics

Name: Alex Inman
Advisor: Prof. Yury Gogotsi

Abstract

The emergence of the Internet of Things (IoT) will require electronics to take on new functionalities and form factors. Integrated functionalities including sensors, conductive traces, energy storage and harvesting must be placed into forms that are flexible and stretchable. The demand for new form factors requires a whole new set of materials from substrates to conductive and functional inks as well as non-traditional fabrication techniques e.g., ink jet printing, screen printing, direct write ink printing. MXenes inks meet many of the demands of these new electronics. They can be formulated as additive free aqueous inks with high conductivity, multifunctionality, and tunable rheology allowing for implementation into various applications with a multitude of fabrication techniques. Additionally, aqueous MXene inks dry at room temperature allowing for temperature sensitive substrates, that cannot be used with current commercial inks, to be used. Herein, we look at additive free aqueous MXene inks in printed electronic. Further, we discuss gaps and issues in the current research as well as paths forward that take advantage of MXene and MXene ink's unique characteristics.