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Licensing Opportunity

Multifunctional Hair Dye from Graphene-Based Materials
NU 2017-068

Inventors
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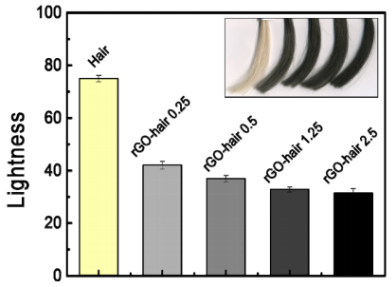
SHORT DESCRIPTION
Rapid and safe multifunctional graphene hair dye
#graphene #consumerproduct #materials



Graphene concentration can be used to control the lightness/darkness of hair

BACKGROUND
Hair dyes are widely used for altering the cosmetic appearance of hair for psychological, aesthetic, fashion and entertainment purposes. However, many commercial hair dyes incorporate harsh, toxic chemicals that can damage the skin and hair, and even cause an increased risk of certain cancers. Furthermore, most commercial hair dyes require an activation time before the chemical reactions complete and the color sets in. Thus there is a significant gap in the market for safer and more efficient hair dye products.

ABSTRACT
Northwestern researchers have devised a new formula for black hair dye using graphene. Leveraging graphene's high surface area, flexibility, electrical and thermal conductivity, the inventors have developed a multifunctional hair dye that can be used to control the lightness/darkness of hair (see figure). The active components include graphene oxide, vitamin C and safe biopolymer binding agents such as chitosan, eliminating the use of harmful chemicals found in most common hair dyes. This allows for safer manufacturing and product profile. The dye is water-based and can be applied onto hair using various methods such as combing, brushing, spraying, dip-coating or soaking. The chemistry of the dye takes advantage of pre-reacted colorants that bind quickly and have high durability with regard to cycles of washing. Furthermore, graphene inclusion imparts additional benefits to this hair dye such as antistatic property, high thermal dissipation, and enhanced UV protection. The dye can be formulated to change color over time and also to exhibit a gradual color change upon UV irradiation. This allows the dyed hair to function as color indicator for UV exposure, with the bonus capability as appealing to the growing fashion of "ombre" hair. Overall, the enhanced properties and safety profile of graphene hair dye offers a safe and robust option for both consumers and manufacturers.

STAGE OF DEVELOPMENT
Tested on human hair for durability, antistatic property, high thermal dissipation, ombre dyeing, and UV properties. Synthesis and composition of dye have been developed and characterized.

APPLICATIONS
- Black hair dye
- Hair dye gradient
- Monitor UV exposure through color changes

ADVANTAGES
- Safe for human hair and health
- Antistatic properties to hair
- UV protection to skin covered by coated hair
- Improved heat dissipation

IP STATUS
Provisional Patent application has been filed.

RELATED PUBLICATIONS

Chong Luo, Lingye Zhou, Kevin Chiou and Jiaxing Huang "Multifunctional Graphene Hair Dye" Chem, 2018, 4, 784-794

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