First synthesis of gold nanoparticles inside human hair for dyeing and much more

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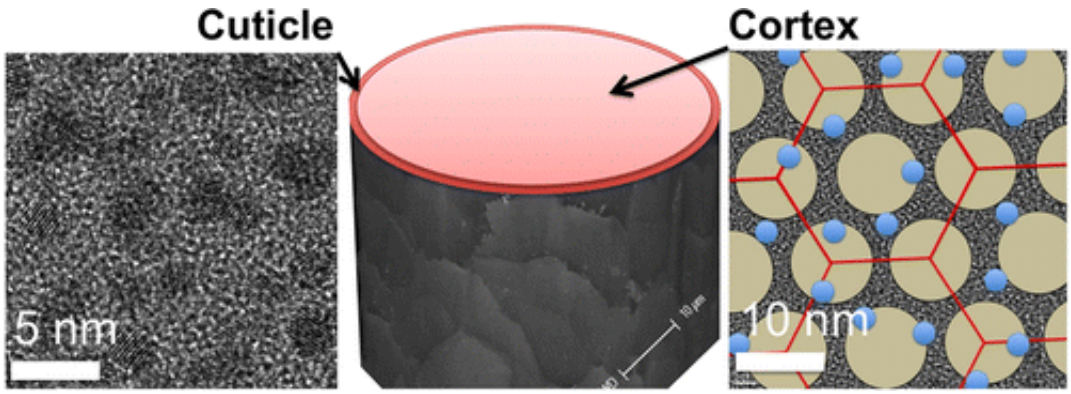

In a discovery with applications ranging from hair dyeing to electronic sensors to development of materials with improved properties, scientists are reporting the first synthesis of gold nanoparticles inside human hairs. Their study appears in ACS' journal *Nano Letters*.

Philippe Walter and colleagues explain that gold nanoparticles —40,000-60,000 of which could fit across the width of a human hair—are a hot topic. Scientists are exploring uses, ranging from electronics and sensors to medical diagnostic tests and cancer treatments. Gold nanoparticles have been deposited on hair for use as electrodes, and gold nanoparticles had been used to dye wool. Walter's team looked at a new use—dyeing hair, inspired by the ancient Greeks' and Romans'

use of another metal, lead, to color their hair.

They describe the first synthesis of fluorescent gold nanoparticles inside human hair. It involved soaking white hairs in a solution of a gold compound. The hairs turned pale yellow and then darkened to a deep brown. Using an electron microscope, the scientists confirmed that the particles were forming inside the hairs' central core cortex. The color remained even after repeated washings.

More information: "Hair Fiber as a Nanoreactor in Controlled Synthesis of Fluorescent Gold Nanoparticles", Nano Lett., Article ASAP. DOI: 10.1021/nl303107w

Abstract

The synthesis and detailed characterization of gold nanoparticles (AuNPs) inside human hair has been achieved by treatment of hair with HAuCl4 in alkaline medium. The AuNPs, which show a strong red fluorescence under blue light, are generated inside the fiber and are arranged in the cortex in a remarkably regular pattern of whorls based on concentric circles, like a fingerprint. It opens an area of genuine nanocomposites with novel properties due to AuNPs inside the hair shaft.

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