

Materials Horizons: From Nature to Nanomaterials

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# Friction Ridge Analysis

Applications of Nanoparticles for Latent  
Fingerprint Development

 Springer

*Editors*

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# Chapter 8

## Green Synthesized Nanoparticles for Development of Latent Fingerprints



Khushboo Gautam, Dipak Kumar Mahida, and Ankita Patel

### Introduction

The evolution of forensic sciences results in significantly better community safety, which is among one of the fundamental basics of human necessities as well as a pillar of growth in the economy. Fingerprints are extremely important pieces of tangible evidence in crime scene investigations [1, 2]. Amidst their individuality and long-term uniformity, fingerprints have also been enormously essential platinum bio-metric traits for qualities for personal authentication in crime scene investigation for over a century. If a hand comes into contact with an object, it leaves a lasting impression in the form of ridges. At the scene of a crime, latent fingerprints (LFPs), also known as hidden fingerprints, are fingerprints that are not apparent to the human eye. The majority of crime scene investigations include the identification of fingerprints. Fingerprinting reveals several fundamental concepts. In forensic science, latent fingerprint recognition has entrenched itself as one of the main approaches to personal identification [3].

The powder method, cyanoacrylate fuming, iodine fuming, ninhydrin, and the silver nitrate technique are all common methods for the formation of latent fingerprints. Non-metallic and metallic powders are used for the formation of latent fingerprints on crime scenes. Due to “their anticipated physical, chemical, and biological capabilities,” scientists are now paying close attention to nanostructured metal oxide and plant-based green nanoparticles that are free from toxicity and environmentally friendly [4–7]. Nanoparticles become essential in the development of sustainable economic advancements to human beings and the ecosystem.

Green-based nanoparticle (also known as biogenic nanoparticles) synthesis is a green chemistry technique that bridges the gap between nanotechnology and forensic—Nanotechnology [7]. The importance of a green synthesis perspective to

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