

# Chapter 12

## Wearable Antenna Materials

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### ABSTRACT

*The aim of this chapter is to identify various materials being used currently for antenna design classified as wearable materials. In the current scenario, no study was found where collectively all the available materials and their properties could be discussed including their pros and cons features. This chapter identifies various available materials on the basis of their characteristics, availability, and the methodology of fabrication being involved along with their corresponding properties. Post detailed study and analysis done in this research enabled us to broadly classify the materials as conductive and substrate materials. This brings to the understanding that earlier no such broader classification was made available, and hence, a comprehensive study would provide us better information availability on various wearable antenna materials.*

### INTRODUCTION

With the advancement in communication technology, the application of antennas has evolved in many innovative concepts. One such concept in recent times is a wearable antenna. The application of antennas involving sensors merging with human use products is defined as wearable antenna.

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These can be in the form of clothing or fabric or tech gadgets like the smart watch, tech specs etc. The mobility and personalized aspect of a wearable antenna make it one of the most profound innovations of modern science in the field of communication. Hence it finds its diverse application in the form of remote monitoring, tracking & navigation, public safety etc.

E textile is one such wearable antenna where the sensors are integrated within the wearable fabric to be used by humans for various purposes and objectives. Usage of e textiles in medical facility or at the times of disaster management etc makes it perhaps one of the most important wearable antennas because of the scale of purpose it aims to solve. Whether it address the lifestyle diseases or helps it in its management or taking the healthcare treatment to an entirely new dimension, the vitality of e textile can neither be ignored nor disputed.

Like any other technology, E textiles do face challenges, in terms of environment changes or life style changes happening in the modern world and even unpredictable issues like the birth of diseases never heard before, etc. Therefore, it is imperative to not only understand the E textile in its essence form but also how various materials would make a difference in combating and addressing issues for which wearable antenna was conceived for.

## **WEARABLE SYSTEM**

Wearable system can be designed as per requirement of application. For wearable system process flow is shown in figure.1. The data generated by a wearable device can be processed on line as well as offline. The most benefitted generation from these wearable is the young generation, which can justify with their dual responsibilities of child and parents. To interpret the raw data generated by a critical wearable device, we need a sequence of actions that keep on adding value to the raw data.

- Sense
- Analyze
- Store
- Transmit
- Utilize

Let us consider an example of a heart patient. To check the criticality of his own condition he will visit a physician, where a nurse documents the vital data

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