

Terahertz non-destructive testing technologies for industrial applications

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Terahertz (THz) technologies have attracted great interest in their possibilities over a wide range of potential industrial applications, including wireless communications, spectroscopy, and imaging. With the increasing diversification of manufacturing processes in various industries, there has been a growing focus on innovative non-destructive testing (NDT) technologies. While there are numerous established NDT methods that utilize technologies such as ultrasonics, visible light, infrared, or ultraviolet waves, there is still a substantial demand for novel NDT technologies that can address the limitations of conventional methods. In this aspect, THz NDT technologies have great potential for their advantageous characteristics: it can penetrate many materials that are absorptive to the lights with much higher spatial resolutions than those of conventional radio frequency waves. Additionally, THz technology can be easily employed as a stand-off NDT solution and is safe for human use. As a result, the development of smaller, cost-effective, and user-friendly THz systems has long been the focus of researchers in this field. As a result, the development of smaller, cost-effective, and user-friendly THz systems has long been the focus of researchers in this field. In this view, we have developed several key components of CW THz systems based on photonics and electronics. Our recent progress in THz NDT technologies with some illustrative examples, their possibilities as industrial applications will be presented in the presentation