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Near Infrared Absorbing Materials Market Assessment, By Material [Organic, Inorganic], By Absorption Range [700-800nm, 800-900nm, 900-1000nm, >1000nm], By Application [Heat Ray Shielding Materials, Laser Welding, Anti-counterfeit, Electronic Sensors, Photovoltaics, Others], By End User [Electrical & Electronics, Telecommunications, Defense & Security, Healthcare, Others], By Region, Opportunities and Forecast, 2016-2030F

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Abstracts

Global near infrared absorbing materials market size was valued at USD 278.32 million in 2022, which is expected to reach USD 522.8 million in 2030, with a CAGR of 8.2% for the forecast period between 2023 and 2030. Infrared light (700-2500 nm) is imperative in various technological applications like heating and drying thermoplastic polymers, coatings, printings, etc. Near infrared material absorbing material must have a specific molecular configuration where excitation of electrons can only lead to absorption of infrared light. Sophisticated and advanced instruments can particularly evaluate material properties, including prominent parameters like transmittance, spectra, and reflectance.

The near infrared absorbing materials have extensive applications in the healthcare sector, including non-imaging lasers. Medical domain practices such as skin treatment, surgery, spectroscopy, thermography, etc. are accomplished using NIR absorbing materials. NIR absorbing materials are used for preparing absorbing dyes that are progressively used as photothermal conversion materials, thermal media materials, etc., which can effectively work in different absorption spectrum ranges.

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Application in the Electronics Sector

Organic materials that are optically active in the wavelength of (1000-2000 nm) range of near-infrared region (NIR) are profoundly emerging materials for applications in photonics and telecommunications. Organic materials are usually optically, thermally, and electrically active in the NIR region, where they can be used for optical attenuation and absorption or antireflection. NIR-absorbing organic semiconductors have generated extreme potential for the organic photovoltaic industry and created multiple applications, including transparent OPVS, tandem OPVs, and photodetectors. Unique properties such as tailorable optoelectronic characteristics, compatibility with flexible substrates, etc. are implementing extensive usage of NIR organic absorbing materials as photodetectors (NIR OPDs).

The data published by the JEITA stated that in 2022, the total global production of electronics and IT industry is estimated to rise by approximately 1% to reach USD 3,436.8 billion. The phenomenal rise in the electronics industry is significantly generating global opportunities for organic NIR absorbing materials to implement as photodetectors that dominate the market.

Production and Synthesis of Infrared Absorbing Materials

Near infrared absorbing materials are considered important in the development of advanced digital cameras and imaging devices. The production of NIR materials involves complex synthesis process, sophisticated equipment, and advanced monitoring control. Every crucial step account for the huge cost of materials where it creates a significant challenge for the widespread usage of NIR materials in more sectors.

NIR absorbing white material comprising the copper pyrophosphate was produced using a wet synthesis process. An aqueous solution of a divalent copper compound and a metal pyrophosphate is formed as a supersaturated solution. The synthesis process is accompanied by stirring, mixing, filtration, acid treatment, washing, and drying, making the manufacturing process complex and costly. However, heat-absorbing glass is formed by NIR absorption of iron components and can be manufactured inexpensively, where these glasses are substantially used in shielding window glass from solar radiation.

Near Infrared Absorbing Materials in Healthcare to Drive the Market

The laser-skin interaction for skin surface applications like hair removal, tattoo removal,

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wound healing depending upon various NIR wavelengths achieves NIR absorbing materials. Medical or healthcare sectors have benefited from using Medical NIR absorbing materials. Healthcare applications such as surgery, skin treatment, spectroscopy, or thermography, NIR absorbing materials are incorporated in such applications. Medical devices such as laboratory-level instruments, are used in hospitals, health centers, clinical trials, etc. Treatments related to human tissue can be effectively accomplished using NIR wavelengths.

A structured data stated that in 2021, the United States has prominently spent around 17.8% of their gross domestic product (GDP) on healthcare sectors which is nearly twice greater than the OECD country. NIR absorbing materials are progressively used in medical and healthcare sectors due to their biocompatibility, skin-related treatments, and medical imaging, substantially utilizing their characteristics for diagnostic imaging and specific therapies. The extensive applications of NIR absorbing materials is propelling the global market size growth with huge opportunities in the respective domains and countries.

Impact of COVID-19

A fast and cost-effective diagnosis method for COVID-19 disease was imperatively necessary in monitoring its proliferation. NIR-spectroscopy is an inexpensive technique for profiling COVID-19 disease that utilizes NIR absorbing materials. It significantly gained momentum during the pandemic as the healthcare sector got a tremendous boom with the rising treatments. Subsequently using NIR absorbing materials this spectroscopic method is used for authentication of COVID-19 vaccines which is recognized as a rapid and effective technique. Potentially during the COVID-19 pandemic the global near infrared absorbing materials market was growing effectively to authenticate COVID-19 vaccines which generated huge market for near infrared absorbing materials.

Impact of Russia-Ukraine War

The invasion of Russia on Ukraine has created unprecedented impact across various sectors leading to instability in sequential investment. The aggression has profoundly affected the global supply chain relationship, raw materials incumbency, etc. The NIR absorbing materials significantly got hit to implement in manufacturing essential infrared equipment that substantially have application in the various healthcare sectors. The harsh sanctions imposed by the United States and Western countries on Russia has severely impacted trade dynamics of technological materials and sharing of respective

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technologies. But with the growing market commodities in the healthcare sector, the demand of NIR absorbing materials is generating huge market potential across the globe.

Key Players Landscape and Outlook

The wide usage of Near Infrared Absorbing Materials in different essential sectors significantly drives the NIR absorbing materials market, encouraging high-tech companies to develop innovative products related to specific properties. Keeling & Walker, a leading global company in tin oxide have developed NIR absorbers in a particular range that comprises of agglomerated nanoparticles in the range of 10-50nm. The key materials in the NIR absorbing are antimony tin oxides, indium tin oxides, and doped tungsten oxides with specific performance profiles.

All NIR absorbing materials in the company are manufactured in compliance with the ISO 9001 Quality Assurance Standard. Based on environmental integrity and sustainable development, Keeling & Walker manufactures NIR products under the ISO 14001 Environmental Management Standard.

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