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United States 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

United States near infrared absorbing materials market size was valued at USD 55.7 million in 2022, which is expected to reach USD 145.9 million in 2030, with a CAGR of 12.8% 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. Sophisticated and advanced instruments can particularly evaluate material properties, including prominent parameters like transmittance, spectra, and reflectance. Near Infrared absorbing coatings are employed in building construction materials, which assist in regulating surface temperatures, reduce energy consumption, and contribute to sustainable building practices.

Near infrared (NIR) 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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Organic Materials are Augmenting the Electronics Sector

Near infrared absorbing materials are profoundly emerging for delivering incredible applications in photonics and telecommunications. NIR organic absorbing materials ' unique electrical and optical properties are employed explicitly for different telecommunication wavelengths that are progressively integrated on optical devices with low-cost fabrication. NIR EC materials are being implemented on new electrochromic VOA (ECVOA) that exhibit reversible and optical changes at the telecommunication wavelengths. Along with specific characteristics such as tailorable optoelectronic characteristics, compatible with flexible substrates, etc. are implementing extensive usage of NIR organic absorbing materials as photodetectors (NIR OPDs).

The data reported by the Investment Monitor’s FDI states that in 2021 around 689 new projects in electronic sectors were commenced across the United States, contributing a percentage increase of 17.4 with respect to previous year. The phenomenal rise in the electronics industry is significantly augmenting the United States market growth 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. These crucial steps 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 is produced using a wet synthesis process, where 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, drying, which makes 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.

NIR Absorbing Materials as Microcapsules for Medical Imaging

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The significance of near infrared absorbing materials has been recognized as an innovative responsive material for numerous applications. Implementation of NIR absorbing materials to develop a NIR-responsive microcapsule system that uses non-contact imaging mode which substantially enhances medical imaging technology. Medical imaging is progressively used in detecting the presence of tumors inside soft tissue such as the prostate and breast, along with screening the skull and thyroid gland. Unnecessary medical treatment, such as biopsy, can be eradicated using non-invasive imaging modalities.

A significant study reported by the International Atomic Energy Agency (IAEA) stated that implementing medical imaging services can effectively avert nearly 2.5 million cancer deaths by 2030. New York (NYC) Health and Hospitals in 2019 released an investment of USD 224 million over ten years to upgrade their medical imaging technology system. Being a leader in medical imaging, GE Healthcare is doing business of USD 19.8 billion in the healthcare sector. The rising medical and healthcare sectors are expected to implement medical and diagnostic imaging in their detection applications, which can substantially propel the demand for the NIR-absorbing materials market in the United States.

Impact of COVID-19

The outbreak of COVID-19 exacerbated the worldwide healthy living of people, where the rapid dispersion of infection severely impacted economic, social, and health infrastructure. Reduction in consumer demand and prevailing uncertainties led to the downfall of products that incorporate near infrared absorbing materials such as automotive, electronics, real estate, etc. 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 grew tremendously with the rising treatments. Subsequently, the spectroscopic method was used to authenticate COVID-19 vaccines using NIR absorbing materials, recognized as a rapid and effective technique. Potentially during the COVID-19 pandemic, the United States market for near infrared absorbing materials 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

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absorbing materials significantly got a hit to implement the manufacturing of essential infrared equipment that substantially have application in the various healthcare sectors. The strict sanctions imposed by the United States on Russia has severely impacted trade dynamics of technological materials and sharing of respective technologies. However, with the growing market commodities in the healthcare sector, the demand of NIR absorbing materials increases, which is generating potential for the United States market.

Key Players Landscape and Outlook

The wide usage of near infrared absorbing materials in different essential sectors is significantly driving the market of NIR absorbing materials which is encouraging high-tech companies to develop innovative products related to specific properties. Epolin is a profound expert in developing near infrared absorbing dyes, inks, and thermoplastic compounds, where the dyes are used in a myriad of thermosets and thermoplastic polymeric materials including polyamide, acrylic, etc. Epolin, a division of Chroma Color Corporation, acquired Adam Gates & Company LLC., which is a quality manufacturer of near infrared absorbing dyes that subsequently provide optimal absorbance and transmission properties.

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