

Development of metal-less bamboo wheelchair

Metal-less wheelchair with both strength and bamboo feel that can pass through airport security

We have developed a metal-less bamboo wheelchair with a wheelchair manufacturer, Sun-so'ing, based in Oita Prefecture and Japan Airlines International (JAL). Normally, wheelchair users who need to fly must undergo extra procedures such as body search at the airport security, since ordinary wheelchairs contain metal parts. Using the metal-less bamboo wheelchairs, they can remain seated during airport security screening. The JIS fatigue strength test for manually propelled wheelchairs is very strict, and the initial type of plastic parts that supported the wheels easily broke.

To overcome this problem, we have developed a two-point support system in the wheel portion to ensure the durability of the product without using metal parts, and have passed the JIS test. Other innovations such as easy-to-use footrests and brakes are also developed. The metal-less bamboo wheelchairs are already in service for passengers at Haneda, Oita, and Itami airports.

Tetsu IWATSUKI

Human Technology Research Institute

iwatsuki.t@aist.go.jp

AIST TODAY Vol.11 No.8 p.13 (2011)



One-point support system (left) and two-point support system (right) of the frame



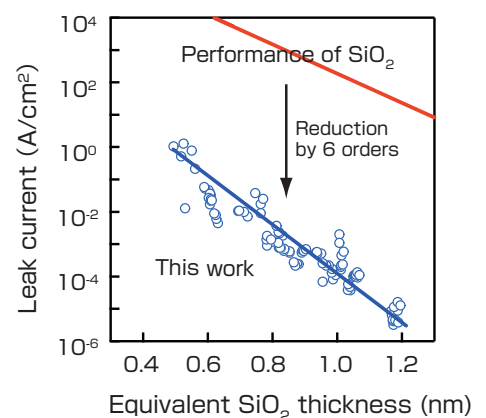
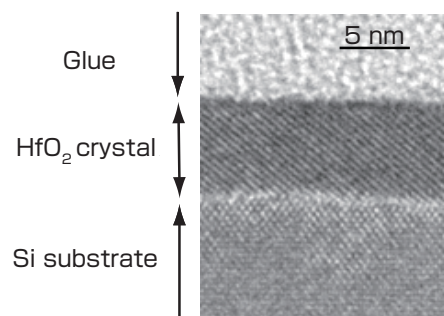
JAL rental wheelchair counter at Haneda airport

Information Technology and Electronics

0.5 nm ultra-thin gate dielectric film

Contributes to low power operation of integrated circuits

An ultra-thin gate dielectric film is developed using epitaxially grown crystalline HfO_2 in place of amorphous SiO_2 . Owing to the large dielectric constant of crystalline HfO_2 which is 5 times larger than that of amorphous SiO_2 , an ultra-thin electrical thickness of 0.5 nm is achieved by a 2.5 nm-thick epitaxial HfO_2 film. The leakage current is 6 orders lower than SiO_2 . This technology is applicable to LSI manufacturing without difficulty, because it was developed based on the crystallization mechanism using LSI tools. Ultra-thin dielectric films contribute to the supply voltage reduction and thus the low power operation of integrated circuits.



Shinji MIGITA

Nanoelectronics Research Institute

s-migita@aist.go.jp

AIST TODAY Vol.11 No.7 p.19 (2011)

(Left) Transmission electron microscope image of epitaxial HfO_2 film on Si substrate
(Right) Advantages of the epitaxial HfO_2/Si structure in the scaling of effective oxide thickness and reduction of gate leakage