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# Study of Diverse Low Emissivity Glass Materials For Indian Green Building Construction

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***Abstract :*** *One third of power consumption in India is because of buildings and the materials there on. Out of which, Glass is one of the noteworthy buildingregion to control cooling loads in buildings. This paper describes how a variety of low emissivity glasses based on transparent conducting oxides are used for buildingwindows have an effect onperformance of green energy buildings.This includes variousmaterials starting from the conventional pigments of silver, oxide materials, non- oxide materials such as nitrides etc.*

## I. Introduction

Till recent times, clear glass was the most important glazingmaterial used in windows. Although glass is strongand allows a high percentage of sunlight into buildings. However, it allows the heat along with white light as it possesses very little resistance to heat flow. But due to increased interest over the impact of energy efficiency concept, in the past two decades, it caused a great change in glazingtechnology of the glasses. Advanced glazings materials coatings have increased windows' resistance to heat flow of the glasses orR-value of the glasses. For a building a window can be considered as a thermal hole which contributes energy exchange of more than 50% of the building's cover through radiation, convection and conduction. [1]. Via thermal radiation twothirds of the thermal losses of a double-glazing window will take place [2], to avoid these losses low-emissivity coatings areapplied widely to build glazingfor energy conservation. The primary problem of conventional low-emissive coatings isthe poor stability of the materials which limits durabilityof the coatings under continuous atmospheric environment [3]. To retain the functional coating for long duration hard coatings over that are used.

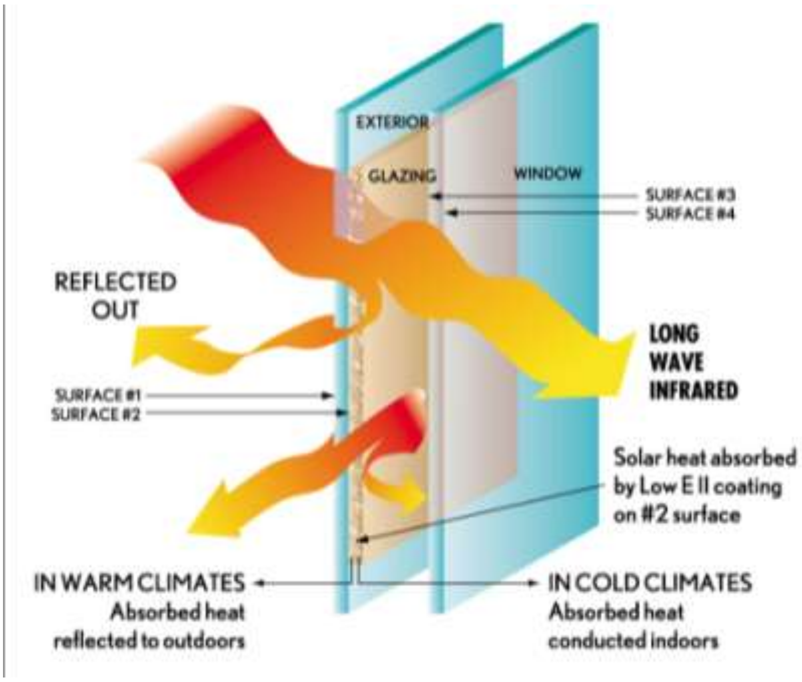


**Figure 1** Schematic of low-e window

## II. Materials

Conventionally metal oxides are usedas coatings in low-e windows. The outer transparent coating of thelow emissivity coatings should be inert to resist itself from chemical attack by the ambient atmosphere. However,conventional oxides are quite difficult to retain them in hard atmospheres. For example, films of Ag tends to beget oxidized and the dielectric layers over that are deposited in the atmosphere with O[4, 5].

Non-oxide films also have been studied for this application. For example, diamond-like carbon films to improve the stability, with a transmittance of only 80 % are used by Cokun et. al,.[6] .Similarly, nitrides are also used as the protective layer in the optical industry. Forinstance, Titanium nitride is one of the most widely used barrier materials as metal cappinglayer[7, 8].However, it is also found that TiN does not have higher thermal stability and which enables it to be easilyadopted the TiN films as the low-e coatings, which posesses a transmittance of above 80% and lowstabilization. In the nitrides category, zirconium nitride is another capablealternative as a hard coating, as it has alesser coefficient of friction than TiN and other transition metal nitrides[9, 10]. In addition to that, if one could increase amount of Al, that can increase thehardness of the films through partial substitution and expand the resistance against oxidation[11, 12].

The infrared low emissivity coating is primarily composed of organic binder and metallicpigment[13]. Amongst these components, aluminium decreases the emissivity of the coating greatly, improve the mechanicalproperties of the coating, and furnish the color of silver to the coating [14],so aluminum powder is such ansignificant part of the coating that itcannot be separated from the coating. Accordingly, knowledge on aluminium with different colors has been carried out for a long time, Le Yuan [15]has prepared the composite pigments with co-precipitation coated$Cr_2O_3$ on the surface of Al powders, while the emissivity of powdersattained above 0.5 in the wavelength range of 8–14 μm, and there alsohave been a few information on composite pigments formed by coating$Fe_3O_4$ on the surface of aluminum powder [16], The lightness L* can bereduced noticeably, while the infrared emissivity is above 0.56 in thewavelength range of 8–14 μm. Guangwen Wu [17] has prepared acoating standed on modified aluminum coated with polyethylene wax,and the gloss of the coating is reduced, while its emissivity andchroma are disagreeable. Weimin Tan [18] has synthesized the Greenishyellow lackluster coatings with Prussian blue (PB) surface tailored Alpowders, but the infrared emissivity of the coating has been amplifiedto above 0.5. To change the color and reduce the lightness, coloredpigments of high concentration were also attempted to be added, then theemissivity of the coating is principallyamplified because most of the coloredpigments are very absorbing materials in the infrared waveband. As the development of the detection technology moves far ahead, inorder to lessen the possibility of being exposed, the stealth coating onthe surface of equipment would better to appreciate the infrared and visiblelight stealth simultaneously, namely, the emissivity and the surfacegloss should be decreased to below 0.3 and 15 respectively. However,according to the above research, the color and the infrared emissivity ofthe compatible coating is hardly able to meet the demand of thepractical application at the same time.

## III. Conclusion

A single type of glazing material is not suitable for everyapplication. Different materials are existing that servedissimilar purposes. Moreover, for one application one maydetermine that it may need combination of two or more types of glazing for ahome which will increase the energy efficiency.

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