



# “Experimental Study On Ecofriendly Photoluminescent Coating”

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**Abstract** - At night time during power outage the the Photoluminescent Coating acts as a illuminating coating. The coating is ecofriendly, easy to prepare has multiple usage, reduces light pollution, has various benefits. This is a ecofriendly illuminating coating it absorbs sunlight during the daytime it illuminates at night time for 6 to 8 hours. (Refer Figure 2). Use of Strontium Aluminate for lighting can work to minimize electricity usage while minimizing excess light pollution. Minimizing light pollution has benefits for people and our environment and ecosystems. In the year 1993 Yasumitsu Aoki of (Nemoto Shokai Co Ltd) discovered the Strontium Aluminate material which is ten times more expensive than the Zinc Sulfide, with an about ten times the brightness and an about the ten times the phosphorescent lifetime. The Strontium Aluminate is the longest lasting and brightest phosphorescent material on the market available currently today.

**Key Words:** Ecofriendly Photoluminescent Coating, Photoluminescent Coating, Photoluminescence Coating, Strontium aluminate, Glow in the dark coating, Environmentally friendly Photoluminescent coating, Non Toxic Photoluminescent Coating, Photoluminescent Coating Non Radioactive, Zero Total Volatile Organic Compounds TVOC, Zero Formaldehyde HCHO.

## 1.INTRODUCTION

The Photoluminescent Coating is a ecofriendly illuminating coating it absorbs sunlight, tube light during the daytime it illuminates at night time for 6 to 8 hours. Use of Strontium Aluminate for lighting can work to minimize electricity usage while minimizing excess light pollution. Minimizing light pollution has benefits for people and our environment and ecosystems. In rural areas there is a unreliable electricity supply, power cuts therefore the Photoluminescent Coating has an indispensable importance in Rural Areas.

### 1.1 MIX DESIGN AND METHODS

- 1) Mix Design Ratio 2:1:0.2 i.e. Clear Resin to Strontium Aluminate to Glass Powder. (Refer Figure 1)
- 2) Dry mix Strontium Aluminate, Glass Power.
- 3) Now add Clear Resin to Strontium Aluminate and Glass Powder mix thoroughly and immediately apply the coating of the required plaster, concrete, sign surface.
- 4) The freshly applied coating remains wet for at least 7 hours do not touch the coating during this 7 hour duration.

**Note Precautions:** Use gloves during mixing, Use brush during applying coating, Use mask.

## 1.2 ADVANTAGES

- 1) To illuminate the Stairway, Corridor during night, electrical power outage.
- 2) To illuminate signs of emergency exit, no smoking, direction signs it is quite effective.
- 3) Life span of Strontium aluminate is high up to 20 years.
- 4) Strontium Aluminate powder of any colour can be used as per the choice of the client. And different colour combinations also can be made.
- 5) The Photoluminescent Coating can be applied on Concrete, Cement plaster, Lime plaster, Gypsum plaster.
- 6) The Strontium Aluminate Photoluminescent Coating is Non Toxic and Non Radioactive.
- 7) The Photoluminescent Coating has Zero Total Volatile Organic Compounds VOC, Zero Formaldehyde HCHO as per the test we have carried out with Air Quality Meter.

## 1.3 DISADVANTAGES

- 1) If the small quantity mix is prepared to coat the small area using very high quality materials then the cost will be high in rs/sqfeet. But if materials are bought in bulk in wholesale the coating price can be reduced to a reasonable price in rs/sqfeet.

## 1.4 APPLICATIONS

- 1) The Photoluminescent coating can be applied to show direction sign, toilet signs, emergency exit sign, other signs such as no smoking, no drinking etc in Homes, Hotels, Convention Centers, Movie Theatre etc where there always dim or mild lighting is used and if electricity is cut off then in these situations the Photoluminescent coating signs are easily visible.
- 2) The Photoluminescent Coating when strategically provided and applied in corridor in strips then the stairs, tread, riser, handrail and the corridors become easily visible in case of electricity power cut or outages, emergency exit situations.



**Figure 1** Ingredients of Photoluminescent Coating Clear Resin, Strontium aluminate, Glass Powder

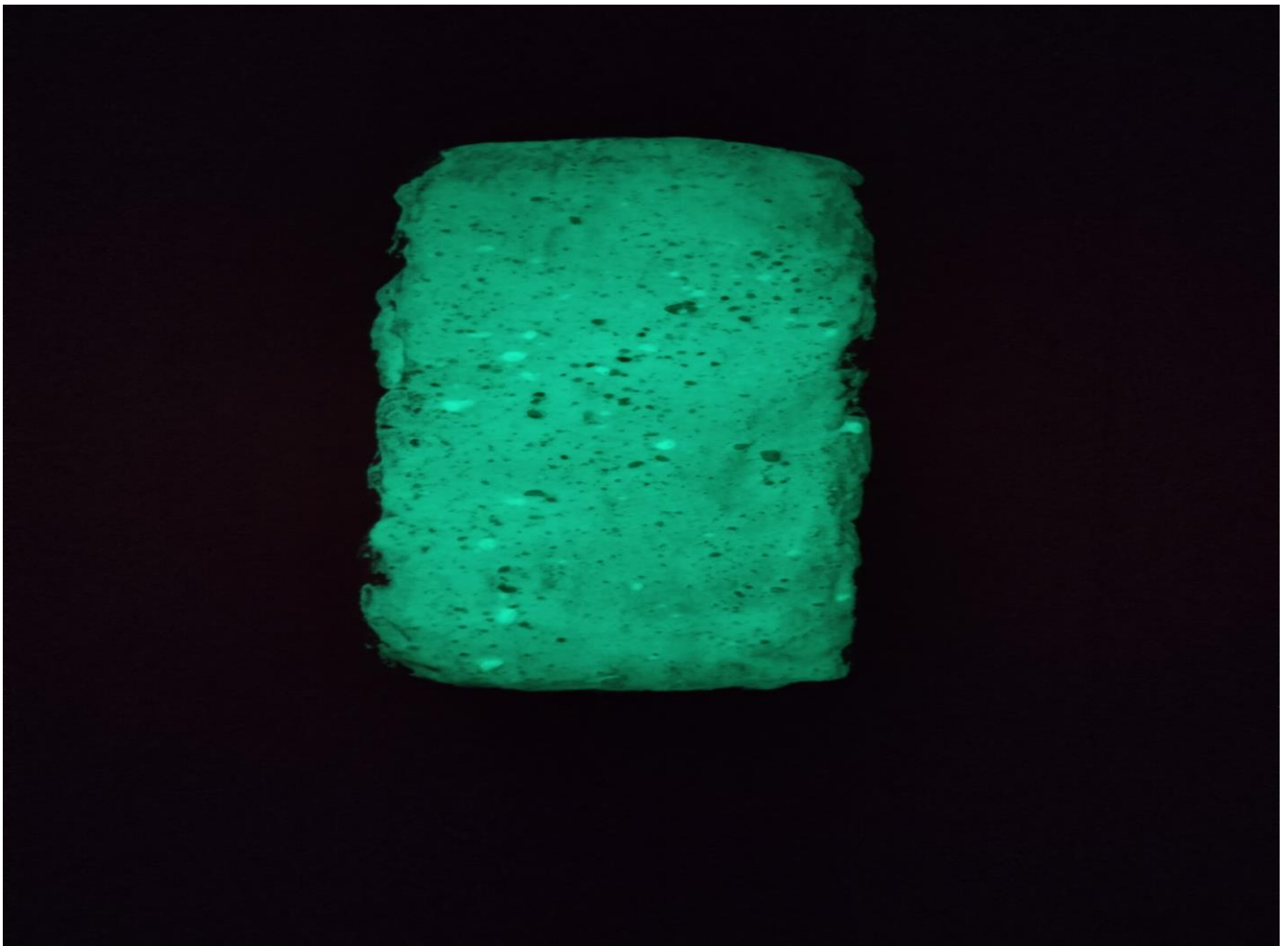


Figure 2 A Clay Brick with Lime Plaster Coated with Photoluminescent Coating Glows Bright At Night 1 am



Figure 3 Air Quality meter test on Photoluminescent Coating

## 1.5 OBJECTIVES

1) To develop Photoluminescent Coating and to Study its practical uses and applications.

## 2. LITERATURE REVIEW

1) Dr.M.Mageswari et. al., The main aim of this study was to prepare glowcrete which glows in dark. The various objectives of this study were 1. To promote eco-friendly and energy efficient construction and 2. To promote smarter construction as in smart roads, smart cities etc, also 3. To improve visibility during night-time etc. In there mix design they have used Phosphorescent material (Strontium aluminate) green colour, solvent epoxy resin, and glass powder. The 2:1 ratio of solvent to Phosphorescent material (Strontium aluminate) green colour. M30 grade of concrete they have used. In their concluding remark they have stated that implementation of photo luminescence induced concrete at a large scale would prove to be an ideal alternative for the illumination of roads and to light up the rural households of the country.

## 3. COSTING AND RATE ANALYSIS

### Costing for Photoluminescence Coating 5 mm per sq feet.

- Clear Resin cost 200 rs/300 ml bottle.
- Strontium aluminate 200 rs/50 gram.
- Glass powder 100 rs/kg.
- Assume, One sq feet can be coated with 1 Resin bottle and 1 Strontium aluminate bottle, 1 Bag of glass powder, 5 mm depth. Hardner + Strontium aluminate + Glass powder = 500 rs/Sq feet.

**Please Note: If the small quantity mix is prepared to coat the small area using very high quality materials then the cost will be high in rs/sqfeet. But if materials are bought in bulk in wholesale the coating price can be reduced to a reasonable price in rs/sqfeet.**

## 4. RESULTS

Table No 1 Total Volatile Organic Compound, Formaldehyde Air Quality Meter Test

Sr No	Parameter	Photoluminescent Coating	WHO Standards
1	Total Volatile Organic Compounds TVOC	0.000 mg/m <sup>3</sup>	< 1 mg/m <sup>3</sup>
2	Formaldehyde HCHO	0.000 mg/m <sup>3</sup>	< 1 mg/m <sup>3</sup>

We can observe that as per Table No 1 The Ecofriendly Photoluminescent Coating is well within the permissible limits of WHO World Health Organization Standard Limits for Indoor Air Pollutants and emits Zero Total Volatile Organic Compounds TVOC, Zero Formaldehyde HCHO. (Refer Figure 3)

The Photoluminescent coating gives satisfactory result with respect to illuminating enough to make the stairway and steps visible during night and electricity power outage as per the test we have conducted. The materials used were fresh and of high quality because of which the rate in rs/sqfeet went high.

## 5. CONCLUSIONS

The Photoluminescent coating uses Strontium Aluminate which absorbs sunlight and light from CFL, Tube light, LED etc and then releases it at night and glows for 6 to 8 hours. The Photoluminescence coating can be provided to indicate the Directions in areas where there is poor lighting and to show Emergency Exit, Left and Right Directions, Latrine Symbols, coating in strips can be provided to illuminate Stairway. We have also observed that the Photoluminescent coating performs better when exposed to sunlight, as compared to tube light. The Photoluminescent Coating has Zero Volatile Organic Compounds VOC, Zero Formaldehyde HCHO as per the test we have carried out with Air Quality Meter.

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