



# JOINT E-CONFERENCE ON RENEWABLE ENERGY AND SUSTAINABILITY & GEO SCIENCE AND GREEN TECHNOLOGY MARCH 15-16, 2023 | WEBINAR



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### Silicon nanostructured silicon nitride on Si- solar cell: material for Si photovoltaics

Silicon rich silicon nitride (SRNS) films have been coated on Si solar cells as antireflection coating (ARC). A detailed photoconductivity measurements and photovoltaic characteristics have been studied in PV device configuration. A significant enhancement in fill factor (FF) and efficiency have been seen with this ARC. This is understood by critically analysing all parameters of the cell under the framework of two diode model. Lower series resistance, high shunt resistance and high fill factor of this device leads to higher efficiency. Two layers ARC architecture has been examined for PV performance.

The observed carrier lifetime,  $J_{sc}$  values and enhanced efficiency (an increment of  $\sim 21\%$  with respect to the bare solar cell) shows that the  $\alpha$ -SiN<sub>x</sub>:H double layer would achieve high absorptivity in various optoelectronic devices and hence is a promising antireflection coating for solar cells.