

Influence of Soil Composition/Color on the Performance of PV Modules in India (PV-6)



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Scientific Achievement:

Soil samples collected from the surface photovoltaic (PV) modules installed in six locations of India have different current or performance losses, for identical surface soiling density, depending on the mineral composition/color in the respective soil types.

Significance and Impact:

Most PV modules, most of the time, in most climates operate at some level of soiled condition around the world. Apart from the soiling density, the soil type or color also has a significant impact on the performance of PV modules. This work quantifies the influence of different soil types on PV module performance.

Research Details:

- Soil samples: Collected from surface of naturally soiled PV modules in various locations in India (Pondicherry, Agra, Hanle, Jodhpur, and Gurgaon) and the United States (Mesa, Arizona).
- Mineral composition: The X-ray diffraction pattern was analyzed to identify the mineral composition using PANalytical's X-ray diffraction software suite.
- Performance: Current-voltage and other performance characterizations were performed to determine the influence of soil type on the performance parameters.

Publication: J.J. John, S. Warade, G. Tamizhmani, A. Kottantharayil, Study of soiling loss on photovoltaic modules with artificially deposited dust of different gravimetric densities and compositions collected from different locations in India, IEEE Journal of Photovoltaics (2016).

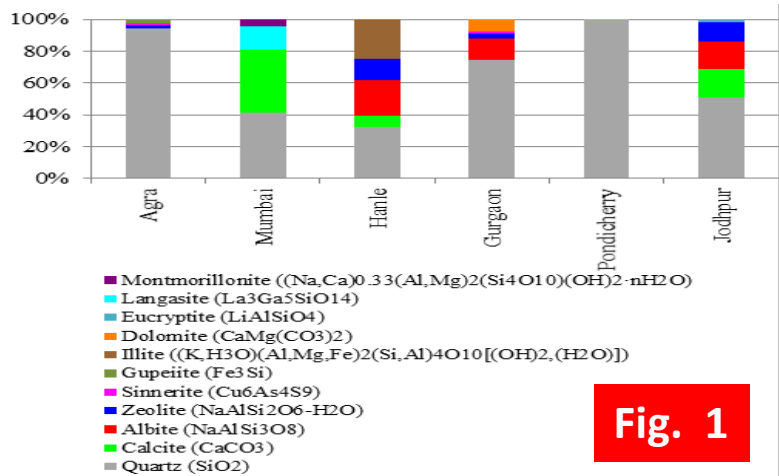


Fig. 1

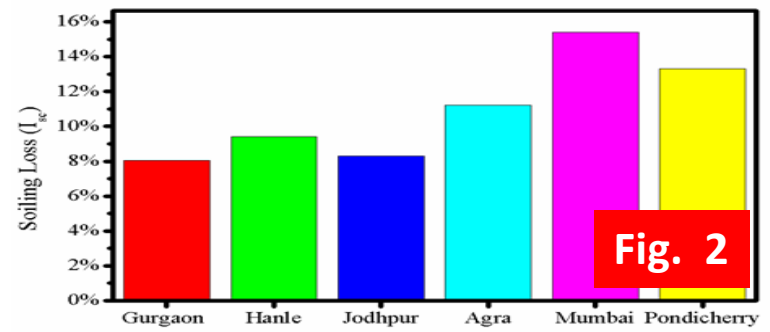


Fig. 2

Wide range of mineral compositions found in the soil samples collected from the surfaces of the modules installed in various locations of India (Fig. 1); Influence of mineral compositions (or color) on the current (I_{sc}) loss of PV modules with 1.8 g/m² soil density (Fig. 2)

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