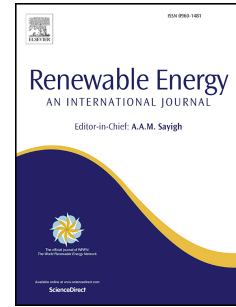


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1 **Spectral characterization of spectrally selective liquid absorption** 2 **filters and exploring their effects on concentrator solar cells**

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7 **Abstract:** Spectrally selective liquid absorption filter can be utilized to enhance
8 performance of PV/T concentrator (CPV/T) systems by splitting solar spectrum into
9 two wavelength bands. In this paper, the optical transmittance of several liquid filters
10 that might be used for CPV/T systems is characterized and their filtering performance
11 is evaluated. The results show that the liquid filters, except for copper sulfate aqueous
12 salt and Valvoline oil, exhibit high transmittance in the wavelength ranges of both
13 silicon concentrator cell and GaAs cell interest, whereas oil filters perform moderate
14 absorption in the NIR range. The effects of these selected liquid filters on the electrical
15 characteristics of concentrator solar cells are reported. Among all selected liquids, oil
16 filters except for Valvoline, and glycols are proved to be the better choices for
17 generating higher cell efficiencies. Finally, a merit function is introduced to evaluate
18 if the liquid filter would effectively convert sunlight into usable energy in systems.
19 The study concludes inorganic aqueous salts except for copper salts, glycols, and
20 Valvoline oil yield market value increase of more than 20% and 34% for silicon cell and
21 GaAs cell, respectively, when compared to PV alone. Of all selected liquids, Valvoline
22 oil produces the highest merit function value.

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