

ZMATH 2011e.00801

Lawson, John; Aggarwal, Pankaj; Leininger, Thomas; Fairchild, Kenneth

Characterizing variability in smestad and gratzel's nanocrystalline solar cells: A collaborative learning experience in experimental design.

J. Stat. Educ. 19, No. 1, 23 p. (2011).

Summary: This article describes a collaborative learning experience in experimental design that closely approximates what practicing statisticians and researchers in applied science experience during consulting. Statistics majors worked with a teaching assistant from the chemistry department to conduct a series of experiments characterizing the variation in measured voltage output of Smestad and Gratzel's nanocrystalline titanium dioxide (TiO₂) solar cells. These solar cells can be constructed easily in a laboratory, and they are reported to produce an open circuit voltage in direct sunlight of 0.3 to 0.5V. Statistics students planned a series of experiments as part of an experimental design class, and the chemistry TA performed the experiments in the lab where the statistics students could observe. The students wrote a description of what they did and the results. From the students' comments about what they learned from this experience, it appears that this type of exercise could be very beneficial in training future consulting statisticians and scientists or technologists who will use experimentation in their work. (Contains 8 figures and 5 tables.) (ERIC)

Classification: M65 K95

Keywords: research design; chemistry; mathematical applications; statistics; learning experience; teaching assistants; laboratory experiments; energy; cooperative learning; consultants; science activities; interdisciplinary approach; units of study; lesson plans; mathematical concepts; mathematics activities; class activities; teaching methods; instructional effectiveness; student attitudes; power technology; sampling
<http://www.amstat.org/publications/jse/v19n1/lawson.pdf>