



PIONEERS IN
COLLABORATIVE
RESEARCH®



Self Powered Silicon

A historical perspective

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In 1994 Bell laboratories had a Design Contest:

“ Can One Replace the Battery in Laptop Computers?”



One entry



- One proposed entry was:

*Self Powered Devices using
nuclear decay in silicon*



How to come in Second in the Div 111 Design Contest: " Can One Replace the Battery in Laptop Computers?"



AT&T Bell Laboratories

subject: **First Laboratory 1111 Design Contest**

date: **January 25, 1995**

from: **D. J. Bishop**

Org. 11114

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To Members of Division 111:

This note is to bring everyone up to date on the outcome of the design contest. We had eight entries whose authors suggested a wide range of physical phenomena that could be used to power a lap top computer. The best submission came from Don Murphy and he is our winner. He and his wife will be our guest for a night out on the town. Others who deserve an honorable mention are Wayne Knox and Steven Hillenius. They will each receive a gift certificate and a free lunch.

In Don's submission, he compared the viability of using mechanical energy as opposed to fuel cells of various designs. In his careful and well thought out analysis he concluded that chemistry probably always wins. For those of you who would like to see a copy of his analysis, it will be circulated as a TM under separate cover. Please contact his secretary Barbara Bennett at MH x2990 for a copy.

We would like to thank those of you who took the time to submit entries. We have judged the contest idea to be a success and plan to try it again in the near future.

MH-11114-DJB-mlr

DAVE
D. J. Bishop

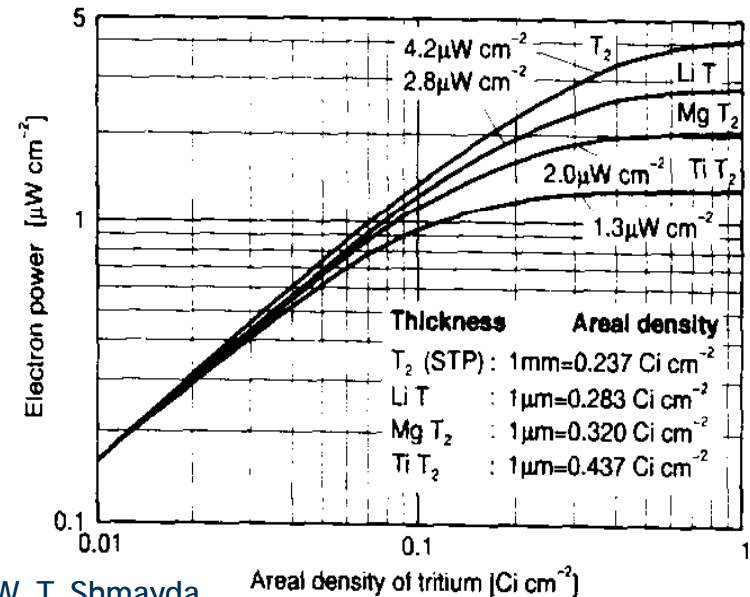
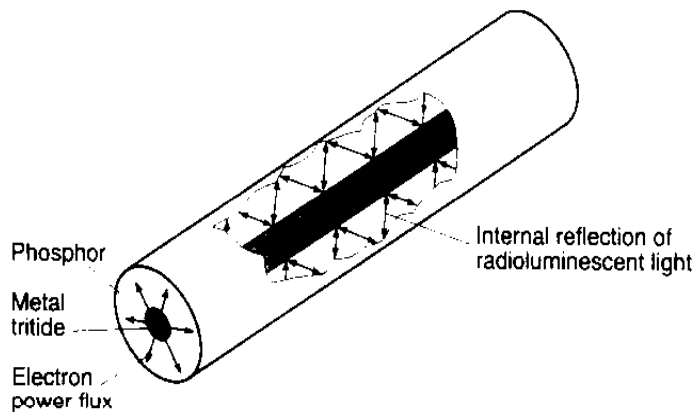


- Power source on the chip application
 - Uses the silicon of the chip as part of the power source
- Integrated power applications may allow lower power circuit design:
 - current supply rather than power storage
 - lower noise?

Realistic energy available From $Ti T_2$ films:

A calculation of the amount of energy coming off of the $Ti T_2$ can be found in the applications for light sources:

* Energy available form the surface of the film is about $1.3 \mu W/cm^2$



*From Radioluminescence Using Metal Tritides" N. P. Kherami and W. T. Shmayda.
Zeitschrift Fur Physikalische Chemie, Bd. 183.S.453-463 (1994)



Conclusion in 1995



-
- Tritium decay can be used for powering devices
 - Practical power production is too small for current wide scale application
 - Uses may rely on using the current source rather than the power storage characteristics of the device



- **Tritium decay can be used for powering devices**
- **Device technology and energy use methodologies have significantly improved in ten years**
- **Laptops are still powered with chemical storage batteries**