Volodymyr A. Semenyuk

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Dr. Semenyuk is an internationally recognized expert on thermoelectrics having 49 years experience in this field of knowledge as well as in related branches of science and technology.

The main trends of scientific activity:
- Thermoelectric materials science
- Irreversible thermodynamics and physics of thermoelectric phenomena
- Theory of optimal control relative to thermoelectricity
- Problems of heat transfer relative to thermoelectricity
- Design and development of novel thermoelectric coolers and devices
- System approach to the harmonization of thermoelectric coolers with other system components
- Thermoelectric technology, with emphasis on sub-miniature thermoelectric coolers for micro electronic and electro-optic components
- Non-stationary effects in thermoelements
- Measurement technique

Main theoretical results:
- Extension of the Pontryagin's principle of maximum to optimal control of functionally graded thermoelectric materials
- Development of the nowel methods of cascade coolers optimization based on the theory of optimal control
- Solution of the series of variational problems in thermoelectricity
- Solution of the problem of transient behavior of multi-stage coolers with arbitrary cascade numbers
- Modeling of the complex thermoelectric systems and development of methods of their optimal coordination
- Computer programs for optimization of TE materials, TE coolers and related systems
- Modeling and evaluation of periodic thermal waves in thermoelements
- Theoretical substantiation of certain characteristic limits in thermoelectricity

Main results in thermoelectric technology:
- Technology of thermoelectric micro coolers on Czochralski grown single crystals with increased thermoelectric efficiency
- Development of standard MC, MD and ML series of micro modules for cooling electronic and electro-optic components
- Technology of subminiature bulk TE coolers, having extremely high heat flux densities including micro modules with diamond substrates (in cooperation with Jet Propulsion Laboratory, California Institute of Techcnology, Ca)
- Short-legged multi-stage thermoelectric coolers with extremely short cool down time
- Thermoelectrically cooled semiconductor lasers, light-emitting diodes, multi-element matrices of infra-red detectors, X-ray detectors, shape memory "smart structures", power amplifiers
- Custom made thermoelectric coolers and systems. Clients include over 60 companies consumers of TE coolers and scientific institutions in EU countries, USA and Asia.

Brief Biography

Born: February 3, 1938
Birth place: Astrakhan, Russia

1955-1960	Student, Technological Institute of Food and Refrigerating Industry, Odessa, Ukraine (now Odessa State Academy of Refrigeration – OSAR)
1967	Ph.D. (Technical Sciences), OSAR
1967-1969	Assistant-Professor, OSAR
1969-present	Principal researcher, Scientific-Research Laboratory, OSAR
1989-1994	Director, Microtep Company
1994-present	Director, owner and founder, Thermion Company

1994-present	Member, International Thermoelectric Society
1995-present	Academician, International Thermoelectric Academy
2005-2006	Member, American Institute of Aeronautics and Astronautics
2007	Organizer and Chairman, 5-th European Conference on Thermoelectrics, Odessa, Ukraine
2007-present	Member, European Thermoelectric Society, officer Board

Publications
1 monograph, 56 papers referred, 33 conference proceedings, 4 invited, 31 author's invention certificates

Selected Recent Publications

V.A. Semenyuk, Problems an Prospects of Multi-Stage Cooling, J. of Thermoelectricity, No. 1, 1998, pp. 1-22.

Semenyuk V. Advances in Development of Thermoelectric Modules for Cooling Electro-Optic Components // Proceeding of International Conference on Thermoelectrics (ICT'2003), Grande Motte, France, August 2003, pp. 631-636 (Invited).

Semenyuk V.A., Advanced Thermoelectric Microcoolers // Proceedings of 23-th International Conference on Thermoelectrics (ICT'2004), Adelaide, Australia, 25-29 July, 2004, IEEE, 2005 (Invited).

Semenyuk, V.A. Thermoelectric Cooling of Electro-Optic Components. Thermoelectrics Handbook: Macro to Nano (ed. D.M. Rowe) Boca Raton, Fl, CRC Press (2006) Chap 58, p. 58-1 – 58-21.

Semenyuk V. Miniature Thermoelectric modules with increased cooling power //Proceedings of the 25-th Intern. Conf. on Thermoelectrics (ECT'2006), Vienna, Austria, August 6-10, 2006, pp. 322-326. (Invited)

V Semenyuk, O. Antonenko. Improvement of Thermoelectric Coolers Reliability, Journ.of Thermoelectricity, No. 4, 2007, pp. 76-84.

V. Semenyuk, R. Dekhtyaruk. Thermoelectrical Cooling under Dimensional Constraints. Journ. of Thermoelectricity, No. 4, 2007, pp. 69-75.

Semenyuk V. On-Chip Hot Spot Cooling: Forecasts and Reality //Proceedings of 6–th European Conf. on Thermoelectrics, Paris, July 2-4, 2008, pp. I-06-1, I-06-6 (Invited)

Monograph: L.I.Anatychuk, V.A.Semeniouk, Optimal control of thermoelectric materials and devices properties, Chernivtsy: Prut, 1992, 264 p. (In Russian).

Reviewer for International Journal **Heat Transfer Engineering.**