Author information

1. Surname, name:

Tsoi Alexander.

2. Position, academic degree, title:

- associate professor, doctor of technical sciences, associate professor, professor of ATU, academician of the International academy of refrigeration (IAR);

- chairman of the IAR Representative office in the RK;

- president of the Association of refrigeration industry and air conditioning of the RK.

3. Education:

- Leningrad technological institute of the refrigeration industry, candidate of technical sciences, 1987, specialty 05.04.03 - "Machines and apparatus for refrigeration and cryogenic equipment and air conditioning systems";

- docent in "Energy, metallurgical and chemical engineering", 2000;

- Academician of the International academy of refrigeration, 2010;

- ITMO University St. Petersburg, doctor of technical sciences, specialty 05.04.03 - "Cars and devices, processes refrigeration and cryogenic technology, systems conditioning and life support", 2022;

- recognized in the RK as a degree of doctor of technical sciences, certificate of the RSE "Center for the Bologna process and academic mobility" of the ME Sof the RK, 2023.

4. Field and directions of research, including participation in scientific projects with a brief description of the research results:

Area and directions of research:

- refrigeration equipment and technological equipment.

Participation in scientific projects:

- 2018-2021, head of the grant-funded project of the Ministry of Education and Science of the Republic of Kazakhstan "Research and development of scientific and engineering foundations for the use of radiative cooling in refrigeration and air conditioning systems", IRN AP05130918.

Results:

- an experimental combined refrigeration system, consisting of a refrigeration machine and a circuit with radiation cooling (RC);

- a computer simulation of the operation of the cold supply system was made, in which the RC is used in conjunction with a refrigerating machine to maintain the temperature for storage (0 °C) year-round. Compared to a compression chiller, this system saves between 7.8 % and 15.9 % energy depending on the climate. For the air conditioning system, saving el. energy was 56 % in the conditions of Almaty;

- an experimental innovative refrigeration system with radiative cooling and natural circulation of the refrigerant has been developed and researched.

System data are proposed to be used for industrial refrigeration and air conditioning.

- 2021-2023, head of the grant-funded project of the Ministry of Education and Science of the Republic of Kazakhstan "Research and development of combined refrigeration systems with radiative cooling for industrial refrigeration and air conditioning", IRN AR09258901.

Results:

- theoretical and experimental studies of radiative cooling were carried out, in which the radiator is integrated into the roof of the industrial refrigerator and is used to cool the refrigeration chamber in winter, and to remove the heat of condensation of the refrigeration machine in summer;

- an industrial refrigerator XK50 with a capacity of 50 tons of apples with an intermediate heat carrier is experimentally investigated, where the RO is used all year round to directly remove heat from the cooled chamber in winter and to reduce the condensation pressure of the refrigeration machine in summer;

- an industrial refrigerator with a capacity of 25 tons with radiative cooling is experimentally investigated, which has the ability to switch to the mode of natural circulation of the refrigerant during the period when the temperature of the atmospheric air drops below that in the cooled chamber.

5. List of the most significant publications (monographs, patents, developed standards):

1. Tsoi A.P., Petrov E.T., Kakimov Kh.Kh., Asambaev A.Zh. Diffuser of centrifugal compressor. A.S. No. 1190092 (USSR) / publ. in B.I., 1985, № 4;

2. Tsoi A.P. Diffuser of centrifugal compressor A.S. № 12500732 (USSR) / publ. in B.I., 1986, № 30;

3. Tsoi A.P., Keikin D.D. A method for regulating a centrifugal compressor. A.S. № 16121110 (USSR) / publ. 07.12.90. in B.I., № 45;

4. Tsoi A.P. Design of refrigeration units at food industry, trade and public catering enterprises. - Almaty, ATI Publishing Department, 1999;

5. Tsoi A.P., Kim I.A. Refrigeration equipment and technology. Almaty, 2012. - 510 p.;

6. Tsoi A.P., Granovsky A.S., Baranenko A.V. Modeling and mathematical program for calculating the value of effective radiation // Bulletin of the International Academy of Cold. - 2014. - № 1. - P. 7-10;

7. Tsoi A.P., Granovsky A.S., Tsoi D.A., Baranenko A.V. Influence of climate on the operation of a refrigeration system using effective radiation into outer space // Kholodilnaya tekhnika. - 2014. - № 12. – P. 36–41;

8. Tsoi A.P., Granovsky A.S., Tsoi D.A. Cold production method and device for its implementation. Patent KZ B 30048 Republic of Kazakhstan. IPC F24D 3/18 (2006.01), F25B 29/00 (2006.01). – Appl. 26.06.2013; publ. 15.06.2015, bul. № 6;

9. Tsoy AP, Granovskiy AS, Baranenko AV, Tsoy DA Effectiveness of a night radiative cooling system in different geographical latitudes // AIP Conference Proceedings. – 2017. Vol. 1876. - 020060;

10. Tsoy AP, Alimkeshova A.Kh ., Granovskiy AS Cooling process modeling of a periodically incoming liquid, using night radiation cooling // AIP Conference Proceedings. – 2018. Vol. 2007, - 030066. - doi: 10.1063/1.5051927;

11. Tsoy AP, Baranenko AV, Tsoy DA Refrigeration systems with the night radiative cooling effect for different regimes and climatic conditions // AIP Conference Proceedings. – 2018. Vol. 2007, - 030066. - doi: 10.1063/1.5051915;

12. Tsoi A.P., Granovsky A.S., Tsoi D.A., Dzhamasheva R.A., Ashikhin A.Yu., Koretskii D.A. Experimental study of the system of night radiation cooling in the summer period // Bulletin of the Almaty Technological University. - 2018. - № 3. - P. 110-117;

13. Tsoi A.P., Li V.T., Meirashev M.A., Smagulova A.U. Installation, operation and repair of refrigeration equipment. - Astana: Non-profit joint-stock company "Holding "Kəsipkor", 2018. - 131 p. – ISBN 978-601-333-526-1;

14. Titlov A., Osadchuk E., Tsoy A., Alimkeshova A., Jamasheva R. Development of cooling systems on the basis of absorption water-ammonia refrigerating machines of low refrigeration

capacity // Eastern-European Journal of enterprise technologies. - 2019. - No. 2/8 (98). – P. 57-67. – DOI: 10.15587/1729-4061.2019.164301. – UDC 621.575:620.91:662.997;
15. Tsoi A.P., Alimkeshova A.Kh., Granovsky A.S. Energy-saving installation with radiative cooling. Patent for PM No. 3797 Republic of Kazakhstan. - publ. 29.03.2019, bul. № 13;

16. A. P. Tsoi, A. S. Titlov , R. A. Dzhamasheva , and A. S. Granovskii , Russ. Installation for cooling milk. Patent for PM No. 4408 Republic of Kazakhstan. - publ. 08.11.2019, bul. № 45;

17. Granovsky A.S., Tsoi D.A., Tsoi A.P. Cold supply system with radiative heat removal. Pat. on PC № 4789 Republic of Kazakhstan. - publ. 03/13/2020. - dec. 02.10.2018. - Bul. № 10;

18. A.P. Tsoi, A.V. Baranenko, A.S. Granovskii, D.A. Tsoi, D.A. Koretskii, and R.A. Dzhamasheva. J. Surf. Computer simulation of the annual cycle of operation of a combined cold supply system using night radiation cooling. Omsk Scientific Bulletin. Series Aircraft-rocket and power engineering. - 2020. - № 3. - P. 28-37. – DOI: 10.25206/2588-0373-2020-4-3-28-37;

19. Tsoi A.P., Akkulov B.G., Smagulova A.U. Textbook for the specialty "Refrigerating compressor machines and installations", qualification "Equipment repair master (in industry). - Nur-Sultan: Non-profit joint-stock company "Talap", 2020. - 318 p.;

20. Alexandr P. Tsoy, Alexandr S. Granovsky, Diana A. Tsoy. Modeling of the operation of a refrigeration unit using radiative cooling to maintain the storage temperature in the cold room // MATEC Web of Conferences. - 2020. - Vol. 324. - 02006. - DOI: https://doi.org/10.1051/matecconf/202032402006;

21. A.P. Tsoy, A.V. Baranenko, A.S. Granovsky, D.A. Tsoy, and R.A. Dzhamasheva. Energy Efficiency Analysis of a Combined Cooling System with Night Radiative Cooling // AIP Conference Proceedings. - 2020. - Vol. 2285. – https://doi.org/10.1063/5.0026908;

22. A.P. Tsoy, A.S. Titlov, A.A. Alimkeshova and R.A. Jamasheva. Development of Autonomous Cooling Systems on the Basis of Renewable and Waste Sources of Heat Energy // AIP Conference Proceedings. - 2020. - Vol. 2285. – https://doi.org/10.1063/5.0026909;

23. N. Radchenko, A. Radchenko, A. Tsoy, D. Mikielewicz, S. Kantor and V. Tkachenko. Improving the Efficiency of Railway Conditioners in Actual Climatic Conditions of Operation // AIP Conference Proceedings. - 2020. - Vol. 2285. – https://doi.org/10.1063/5.0026789;

24. Radchenko, N. Radchenko, A. Tsoy, B. Portnoi and S. Kantor. Increasing the Efficiency of Gas Turbine Inlet Air Cooling in Actual Climatic Conditions of Kazakhstan and Ukraine // AIP Conference Proceedings. - 2020. - Vol. 2285. - https://doi.org/10.1063/5.0026787;

25. Radchenko E. Trushliakov, A. Radchenko, A. Tsoy and O. Shchesiuk. Methods to Determine a Design Cooling Capacity of Ambient Air Conditioning Systems in Climatic Conditions of Ukraine and Kazakhstan // AIP Conference Proceedings. - 2020. - Vol. 2285. – https://doi.org/10.1063/5.0026790;

26. Radchenko, N. Radchenko, A. Tsoy, S. Forduy, Z. Anatoliy and I. Kalinichenko. Utilizing the Heat of Gas Module by an Absorption Lithium-Bromide Chiller with an Ejector Booster Stage // AIP Conference Proceedings. - 2020. - Vol. 2285. – https://doi.org/10.1063/5.0026788;

27. Granovsky A.S., Tsoi A.P., Tsoi D.A. Refrigeration system combined with a radiant cooling unit and a vapor compression machine. Pat. No. 35182 Republic of Kazakhstan. - dec. 05/22/2020, publ. 22.05.2020, bul. № 27;
28. Cherednichenko A.V., Cherednichenko V.S., Tsoi A.P., Komleva V.S., Tokpaev Z.R. Evaluation of emissions from ODS fluorine substitutes in Kazakhstan as part of the national inventory of greenhouse gases // Hydrometeorology and Ecology. - 2021. № 1. - P. 130-146;

29. Tsoy, A., Titlov, O., Granovskiy, A., Koretskiy, D., Vorobyova, O., Tsoy, D., & Jamasheva , R. Improvement of refrigerating machine energy efficiency through radiative removal of condensation heat / / Eastern-European Journal of Enterprise Technologies. - 2022. - Vol. 1. No. 8(115). – P. 35-45. https://doi.org/10.15587/1729-4061.2022.251834;

30. Tsoy A., Granovskiy A., Tsoy D., Koretskiy D. Cooling capacity of experimental system with natural refrigerant circulation and condenser radiative cooling // Eastern-European Journal of Enterprise Technologies. - 2022. - Vol. 2. № 8(116). - P. 45-53. https://doi.org/10.15587/1729-4061.2022.253651;

31. Yerdesh Y., Amanzholov T., Aliuly A., Seitov A., Tsoy A., Toleukhanov A., Murugesan M. Experimental and Theoretical Investigations of a Ground Source Heat Pump System for Water and Space Heating Applications in Kazakhstan // Energies. – 2022. – 15(22). – 8336. – https://doi.org/10.3390/en15228336;

32. Sulin AB, Kamara S., Tsoi AP, Oraibi AFMA, Belyakov VN Prospects of solar refrigeration machines application // AIP Conference Proceedings. - 2022. - Vol. 2486. - 040010. - https://doi.org/10.1063/5.0106038.

6. Scientific internships:

- training under the advanced training program "Cryogenic machines and systems for cleaning cryogenic gases", 2013;

- Institute of additional professional education, St. Petersburg, State university of low Temperature and food technologies, 2012;

- passing advanced training courses "Automation and Control" № 1550 dated March 03, 2012, Republican institute for advanced studies at the Kazakh national technical university named after K.I. Satpaev, 2012;

- completion of advanced training courses on the development of electronic courses and work in the environment of the automated learning management system "E-LEARN!Server" from 10.01.2011;

- passing of the seminar "Theory and equipment of Danfoss for refrigeration systems" on October 29 and 30, 2018.;

- Special american business internship training program "Cold chain logistics for Eurasia", USA, Washington, October 15-29, 2022.

7. Achievements in research, teaching activities (awards):

- Honorary diploma of the MES of the RK, 2017;

- Medal "Certificate of merit ", ATU, 2017;

- The owner of the title "Best researcher", Association of universities of the RK, 2019;
- Badge "Honorable Machine Builder" Ministry of industry and infrastructure development of the RK, 2022;

- Badge "For merits in the development of science of the Republic of Kazakhstan" of the MES of the RK, 2022

8. E-mail address, contact details (tel.: work. (ext.), cell.):

E-mail: tsoyteniz@bk.ru

Cell. tel.: 8-777-232-92-54.