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Binary Gas Mixtures of Light Helium to Intensify Laminar Forced Convection in Round Tubes ANTONIO CAMPO, Mechanical Engineering, The University of Vermont, Burlington, VT 05405, SALAH CHIKH, Faculte de Genie Mecanique et Genie des Procedes, Universite des Sciences et Technologie Houari Boumediene, Bab Ezzouar 16111, Algeria, MOHAMMAD PAPARI, MAHAMMAD MOBINIPOUYA, Department of Chemistry, Shiraz University of Technology, Shiraz, 71555, Iran — This paper addresses potential heat transfer enhancement of laminar gaseous flows inside tubes with constant wall temperatures. The goal is to investigate the capabilities of certain binary gas mixtures of light helium as the primary gas with nitrogen, oxygen, carbon dioxide, methane, sulfur hexafluoride and tetrafluoromethane as the secondary heavier gases. The velocity of the binary gas mixtures is fully established and the temperature develops from a uniform value. The thermophysical properties of the binary gas mixtures depend on the molar gas composition in the w-domain [0, 1]. The two case studies involve a low mean bulk temperature of 300 K and the other a high mean bulk temperature of 600 K, both sharing 1 atm. The two target parameters for analysis and design are the maximum heat transfer rate and the pressure drop at the optimal molar gas composition.

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