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THERMAL CONDUCTIVITY AND HEAT TRANSFER OF CERAMIC NANOFLUIDS SHOW CLASSICAL BEHAVIOR

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SUMMARY: This study is motivated by the controversies surrounding nanofluids. Employing a rather simple test rig (straight circular pipe) we will indicate that no anomalous heat transfer enhancement due to effects like microconvection occurs in laminar entrance flow. Our findings show that nanofluids behave like any equivalent liquid with similar thermophysical properties. The thermophysical properties necessary to interpret the results of these experiments were measured very carefully. It was found that the thermal conductivity of five different nanofluids – measured with a sophisticated ring gap apparatus – does not show any anomalous behavior. However, the dynamic viscosity is significantly increased compared with the basefluid.