

A Comparative Study for Material Selection of Sensor Element Using Analytic Hierarchy Process

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Abstract: Material selection is crucial for sensor elements. Because of the numerous material alternatives available in the market, systematic methods must be employed to select the most suitable sensor material that satisfies technical, metrological and economic criteria. In this study, analytic hierarchy process (AHP) is employed for the selection of sensor material. Twenty common materials are classified in three groups according to their elasticity modulus, and then the best sensor material in each group is determined then the AHP rankings of the materials are calculated. The results show that AISI 4340 steel and CuBe alloy are the most suitable materials within the high- and lower-modulus groups, respectively, and Ni-Span-C is another good alternative sensor element.

Keywords: Material selection; Sensor materials; Multi-criteria analysis; Analytic hierarchy process