別紙4

| 報告番号 | ※ 乙　　第　　号 |
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# 主 論 文 の 要 旨

論文題目　Development of a Materials Design Platform for Fabricating New Composites with Required Thermo-physical Property
（新規熱特性を有する複合材料創製のための材料設計システムの開発と応用）

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# 論 文 内 容 の 要 旨

Thermo-physical properties such as specific heat, thermal conductivity, thermal diffusivity, etc. of composites directly influence the materials' resistance to thermal stress and thermal shock, and therefore are important basic properties that must be considered in industrial application. However, little attention was paid on these properties in composites design so far, in which mechanical properties such as strength and so on were usually concentrated on. In this work, we proposed an optimized process of materials selection, structural design and property prediction for designing composites with required thermo-physical properties, based on physical theory and experimental experiences, and developed a platform of composite design and thermo-physical properties prediction using advanced information processing technology.

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This system has been used to predict the thermal conductivity of some real composites such as Mo/$Al_2O_3$, SiC/Al alloy, YSZ thermal barrier coatings, etc. The results are in good agreement with the experimental data, so the reliability and effectiveness of the system has been proved.

This system has been opened to Internet access, and is expected to be a useful tool for new materials development, materials research and education.