# ナノ材料工学 Nanomaterials Engineering


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グラフェンに代表されるナノ材料の作製し、それを機械材料へ応用する研究を展開している。ナノ材料に関わるプロセス/構造/特性の相関関係について研究を進めている。グラフェン、窒化ホウ素などのナノシートを単離し、凝集を抑制させながら3次元構造を取ることで、ナノシートの特性をバルク材料に真に発揮させることを目標としている。ナノ材料の特性を引き出すことで、機械的特性の向上、熱伝導率の向上、耐食性の向上など、機械材料に多機能性を付与する。

We are developing nanomaterials such as graphene and applying them to engineering materials. We are trying to reveal relationships for process//structure/properties of nanomaterials. By isolating nanosheets such as graphene and boron nitride and constructing bulk materials without forming agglomeration, the goal is to bring out the properties of nanosheets in bulk materials. Based on fundamental research of nanomaterials engineering, we will add multifunctional properties to engineering materials such high mechanical strength, improving thermal conductivity and high corrosion resistance

## ■代表論文および著書/Representative publications


1. Jonathon D Tanks, Yoshihiko Arao, Masatoshi Kubouchi, Network-level analysis of damage in amine-crosslinked diglycidyl ether resings degraded by acid, eXPRESS Polymer Letters, 2022, 231, 109560.
2. Takuma Hanaoka, Hiroki Ikematsu, Suguru Takahashi, Natsuki Ito, Noriaki Ijuin, Hiroyuki Kawada, Yoshihiko Arao, Masatoshi Kubouchi, Recovery of carbon fiber from prepreg using nitric acid and evaluation of recycled CFRP, Composites Part B, 2022, 231, 109560.
3. Takuma Hanaoka, Yoshihiko Arao, Yoshihito Kayaki, Shigeki Kuwata, Masatoshi Kubouchi, Analysis of nitric acid decomposition of epoxy resin network structures for chemical recycling, Polymer Degradation and Stability, 2021, 186, 109537.
4. Yoshihiko Arao, Jonathon D. Tanks, Kojiro Aida, Masatoshi Kubouchi, Exfoliation behavior of large anionic graphite flake in liquid produced by salt-assisted ball milling, Process, 2020.
5. Yasutomo Koga, Yoshihiko Arao, Masatoshi Kubouchi, Application of small punch test to lifetime prediction of plasticized polyvinyl chloride wire, Polymer Degradation and Stability, 171, 109013, 2020.
6. Yoshihiko Arao, Riichiro Kuwahara, Kaoru Ohno, Jonathon D. Tanks, Kojiro Aida, Masatoshi Kubouchi, Shin-ichi Takeda, Mass production of low-boiling point solvent- and water-soluble graphene by simple salt-assisted ball milling, Nanoscale Advance, 1, 4955-4964, 2019.
7. Yoshihiko Arao, Jonathon D. Tanks, Masatoshi Kubouchi, Akira Ito, Atsushi Hosoi, Hiroyuki Kawada, Direct exfoliation of layered materials in low-boiling point solvents using weak acid salts, Carbon, 142, 261-268, 2019.
8. Yoshihiko Arao, Jonathon D. Tanks, Kojirou Aida, Masatoshi Kubouchi, Mechanochemical reaction using weak acid salts enables dispersion and exfoliation of nanomaterials in polar solvent, Journal of Materials Science, 54, 4546-4558, 2019.
9. Fumiya Mori, Masatoshi Kubouchi, Yoshihiko Arao, Effect of graphite structures on the productivity and quality of few-layer graphene in liquid phase exfoliation, Journal of Materials Science, 53, 10807-10815, 2018.
10. Jonathon D. Tanks, Yoshihiko Arao, Masatoshi Kubouchi, Diffusion kinetics, swelling, and degradation of corrosion-resistant C-glass/epoxy woven composites in harsh environments, Composite Structures, 202, 656-694, 2018.
11. Yoshihiko Arao, Fumiya Mori, Masatoshi Kubouchi, Efficient solvent systems for improving productivity of few-layer graphene in liquid phase exfoliation, Carbon, 118, 18-24, 2017.
12. Yoshihiko Arao, Yoshinori Mizuno, Kunihiro Araki, Masatoshi Kubouchi, Mass production of high aspect ratio few-layer-graphene by high speed laminar flow in liquid, Carbon, 102, 330-338, 2016.
13. Yoshihiko Arao, Masatoshi Kubouchi, High-rate production of few-layer graphene by high-power probe sonication, Carbon, 95, 802-808, 2015.
14. Yoshihiko Arao, Taro Fukui, Tomoyuki Niwa, Hiroyuki Kawada, Dimensional stability of epoxy-based and cyanate-based carbon fiber-reinforced plastics, Journal of Composite Materials, 49, 1483-1492, 2015.



荒尾研における大面積ナノシートの作製プロセスの一例