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| **Published Researches**  **الأبحاث المنشورة** | |
| Title  **عنوان البحث** | * Using various concentrations of SiO2 aerogel for oil wicking, spreading, and interception tests of 3D weft-knitted spacer fabrics |
| Author  **الناشر** | * Syed Rashedul Islam, Alrayah HD Yousif, Hewan Dawit Estifanos, Ishaq Lugoloobi, Abeer Alassod, Wang Wendi, Jinhua Jiang, Huiqi Shao |
| Source Title  **اسم المجلة** | * The Journal of the Textile Institute |
| ISSN |  |
| Q | Q2 |
| Link  **رابط البحث من موقع المجلة** | DOI: [10.1039/D2RA03214G](https://doi.org/10.1039/D2RA03214G) |
| Abstract  **خلاصة** | * The main objective of this study was to define the influence of silica aerogels (SAs) through the sol-gel method and oil properties on 3 D weft-knitted spacer fabric sorbents for oil wicking, spreading, swelling, and interception properties (used as an interceptor barrier for vegetable and engine oil in static and dynamic water tests). SEM, FTIR-ATR, XRD, and BET tests of fabric sorbents were studied to explain the impact of SAs. The oil spreading rate exposed that the higher pore diameter, specific surface area, surface roughness, silica add-on %, water contact angle, and lower surface energy of sorbents exhibited the higher wicking height of 91.5 mm and 85.6 mm for vegetable oil and engine oil, respectively (TS 5). Similarly, the static intercepting experiment showed the higher oil interception efficiency of 99.01% and 99.89% with the initial leaking time of 24 min and 26 min for vegetable oil and engine oil, respectively. Likewise, the dynamic intercepting test (with water flow rates of 150 mL/s) revealed the higher oil interception efficiency of 98.89% and 99.77% with the initial leaking time of 10 min and 12 min, individually. Moreover, the treated sample showed the lowest oil swelling thickness (0.2 ± 0.1%) whereas the untreated sample showed the highest oil swelling thickness (7.3 ± 0.5%). The experimental results discovered that silica aerogels, fabric properties, and oil features had a substantial impact on oil wicking, spreading, swelling, static, and dynamic tests. Thus, these fabrics could be appropriate for industrial uses as eco-friendly oil clean-up sorbent. |