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**Article:**

Lee, T-H., Suh, H-Y., Han, S-K. et al. (2 more authors) (2016) Effect of a heat treatment on the precipitation behavior and tensile properties of alloy 690 steam generator tubes. *Journal of Nuclear Materials*, 479. pp. 85-92. ISSN 0022-3115

<https://doi.org/10.1016/j.jnucmat.2016.06.038>

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- The intergranular carbide was identified as chromium rich (Cr-rich)  $M_{23}C_6$  carbide.
- The  $M_{23}C_6$  carbides are closely related to the grain boundary characteristics.
- The mechanical properties are associated with the precipitation of Cr carbides.