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- (71) **Applicant (for all designated States except BB, CN):**
NANOFILM TECHNOLOGIES INTERNATIONAL PTE LTD [SG/SG]; 28 Ayer Rajah Crescent, #02-02/03/04, Ayer Rajah Industrial Estate, 139959 (SG).
- (71) **Applicant (for CN only):** **NANOFILM VACUUM COATING (SHANGHAI) CO., LTD** [CN/CN]; No. 399, Songhui Road, Quingpu District, Shanghai, 201703 (CN).
- (71) **Applicant (for BB only):** **SCHLICH LTD** [GB/GB]; 9 St Catherine's Road, Littlehampton West Sussex BN17 5HS (GB).
- (72) **Inventors:** **SHI, Xu**; 28 Ayer Rajah Crescent, #02-02/03/04, Ayer Rajah Industrial Estate, 139959 (SG).
TANG, Zhi; 28 Ayer Rajah Crescent, #02-02/03/04, Ayer Rajah Industrial Estate, 139959 (SG).
- (74) **Agent:** **SCHLICH**; 9 St Catherine's Road, Littlehampton West Sussex BN17 5HS (GB).

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(54) **Title:** TA-C BASED COATINGS WITH IMPROVED HARDNESS

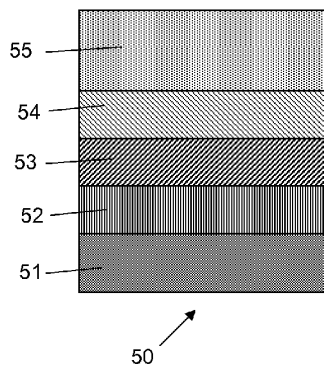


Fig. 5

(57) **Abstract:** A substrate is coated with a multi-layer coating, comprising in order: (i) a first functional layer comprising ta-C, (ii) a second functional layer comprising ta-C, (iii) (a) a third functional layer comprising ta-C and a first intermediate layer comprising a carbide of a first element, or (b) a first intermediate layer comprising a carbide of a first element, and a second intermediate layer comprising the first element, wherein the ta-C has a hydrogen content less than 10% and an sp² content less than 30%; wherein (i) the Young's modulus or (ii) the hardness or (iii) both the Young's modulus and the hardness independently stay the same or increase from layer to layer in (iii) (a) from the first intermediate layer to the first functional layer, or in (iii) (b) from the second intermediate layer to the first functional layer.

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