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1. , 2009. 64 .
2. , 1988. 240 .
3. , 1989. . 64–65.
4. 2007. 2(18). . 112–121.
5. , 2010. 254 .
6. 640 . , 2005.
7. ISTFE-14, : , 2014. . 221–244.
8. , 1971. 543 .
9. . 1995. 21. 5. . 422–433.
10. , 2012. 727 .
11. Ehiasarian A. P., Wen J. G., Petrov I. Interface microstructure engineering by high power impulse magnetron sputtering for the enhancement of adhesion. Journal of Appl. Physics. 101 (2007), 054301.

12. . . . ., 1998. 218 .
13. *Musil J., Suna J.* The role of energy in formation of sputtered nanocomposite films. *Vfter. Scien. Forum.* 2005. V. 502. P. 239–260.
14. . . . ., 1991. 144 .
15. . . . . 2013. 2. . 62–68.
16. . . . ., 102744 . 23 14/00. / . . . . 28.10.2013; . 24.01.2014. 1.
17. . . . . 2013. 4. 43–57.
18. . . . . 2015. 85. . 2. . 126–134.
19. . . . . 2007. 26 .
20. . . . . 1968. 220 .
21. . . . . 1963 . .LXXXI. . 3. . 409–452.
22. *Kouznetsov V., Macak K., Schneider J. M., Helmersson U., Petrov I.* A novel pulsed magnetron sputter technique utilizing very high target power densities. *Surf. Coat. Technol.* 1999. V. 122. Iss. 2–3. Pp. 290–293. doi: 10.1016/S0257-8972(99)00292-3
23. *Poolcharuansin P., Bowes M., Petty T. J. and J. W. Bradley.* Ionized metal flux fraction measurements in HiPIMS discharges. *Journal of Phys. D: Appl. Phys.* (2012). 45. P. 1–5.

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19.06.2019