4. CONCLUSIONS

This paper focuses on DLC and Cr-DLC films on silicon and biomedical alloy substrate (Ti-6Al-4V). The layers were prepared using dual Pulsed Laser Deposition (PLD) using two targets (graphite and chromium). The Cr content increased from 2.2 to 17.9 at. %. The layers were generally smooth with rare droplets. The contact angle measurements for water showed that the contact angle of Cr-DLC films (90°) was higher than DLC film (70°) and surface free energy of Cr-DLC films (43 mN/m) was lower than DLC film (33 mN/m).

ACKNOWLEDGMENTS

We thank the Institutional research plan AV010100522, grant of the Czech Technical University in Prague SGS12/167/OHK4/2T/17 and SGS12/088/OHK4/1T/17, and the Ministry of Education, Youth and Sports of the Czech Republic for grants COST LD12069.

REFERENCES

[1] J. Robertson: Mater. Sci. Eng. R. **37**(4-6), 129 (2002)
[2] A. Grill: Diamond Relat. Mater. **8**(2-5), 428 (1999)
[3] R. J. Narayan: "Functionally Gradient Hard Carbon Composites for Improved Adhesion and Wear," Mater. Sci. Eng. NCSU_doctoral_2002_08_06 (2002)
[4] T. Kocourek, M. Jelínek, V. Vorlíček, J. Zemek, T. Janča, V. Žížková, J. Podlaha, C. Popov: Appl. Phys. A **93**(3), 627 (2008)
[5] M. Jelínek, K. Smetana, T. Kocourek, B. Dvořánková, J. Zemek, J. Remsa, T. Luxbacher: Mater. Sci. Eng. B **169**(1-3), 89 (2010)
[6] M. Jelínek, T. Kocourek, J. Remsa, J. Mikšovský, J. Zemek, K. Smetana, B. Dvořánková, T. Luxbacher: Appl. Phys. A **101**(4), 579 (2010)
[7] N. Dwivedi, S. Kumar, C. M. S. Rauthan, O. S. Panwar: Plasma Process. Polym. **8**(2), 100 (2011)
[8] J. A. Colón Santana, V. Singh, V. Palshin, E. M. Handberg, A. G. Petukhov, Y. B. Losovyj, A. Sokolov, I. Ketsman: Appl. Phys. A-Mater. Sci. Process. **98**(4), 811 (2010)
[9] J. A. C. Santana, R. Skomski, V. Singh, V. Palshin, A. Petukhov, Y. B. Losovyj, A. Sokolov, P. A. Dowben, I. Ketsman: J. Appl. Phys. **105**(7), art. no. 07A930 (2009)
[10] W. Dai, P. Ke, A. Wang: *Vacuum* **85**(8), 792 (2011)
[11] W. Dai, H. Zheng, G. Wu, A.Wang: *Vacuum* **85**(2), 231 (2010)
[12] S. K. Pal, J. Jiang, E. I. Meletis: Surf. Coat. Technol. **201**(18), 7917 (2007)
[13] Y. Xiang, W. Cheng-biao, L. Yang, Y. De-yang, F. Zhi-qiang: Surf. Coat. Technol **200**(24), 6765 (2006)
[14] J.-Y. Jao, S. Han, L.-S. Chang, C.-L. Chang, Y.-C. Liu, H.C. Shih: Appl. Surf. Sci. **256**(24), 7490 (2010)
[15] W. Dai, G. Wu, A. Wang: Diamond Relat. Mater. **19**(10), 1307 (2010)
[16] J. Y. Jao, S. Han, L. S. Chang, Y.-C. Chen, C.-L. Chang, H.C. Shih: Diamond Relat. Mater. **18**(2-3), 368 (2009)
[17] H. Renondeau, R. I. Taylor, G. C. Smith, A. A. Torrance: Proc. Inst. Mech. Eng. Part J.-J. Eng. Tribol. **222**(3), 231 (2008)
[18] A. Czyzniewski: Plasma Process. Polym. **4**(SUPPL.1), S225 (2007)
[19] V. Singh, J. C. Jiang, E. I. Meletis: Thin Solid Films **489**(1-2), 150 (2005)
[20] D.-Y. Wang, K.-W. Weng, S.-Y. Hwang: Diamond Relat. Mater. **9**(9), 1762 (2000)
[21] Y.-Y. Chang, D.-Y. Wang: Surf. Coat. Technol **200**(10 SPEC. ISS.), 3170 (2006)
[22] N. Ali, Y. Kousar, T. I. Okpalugo, V. Singh, M. Pease, A. A. Ogwu, J. Gracio, E. Titus, E. I. Meletis, M. J. Jackson: Thin Solid Films **515**(1), 59 (2006)
[23] S. J. P. Laube, A. A. Voevodin, K. D. Keener, S. R. Leclair: Eng. Appl. Artif. Intell. **11**(5), 649 (1998)
[24] D. Sheeja, B. K. Tay, S. P. Lau, X. Shi, J. Shi, Y. Li, X. Ding, E. Liu, Z. Sun: Surf. Coat. Technol. **127**(2-3), 247 (2000)
[25] S. Baragetti, L. Lusvarghi, G. Bolelli, F. Tordini: Surf. Coat. Technol. **203**(20-21), 3078 (2009)
[26] J. L. Pochou, F. M. A. Pichoir, D. Boivin: Proc. 12th Internat. Conf. X-ray Optics Microanalysis, Cracow, Poland, Polish Academy of Mining and Metallurgy Printing House, 52 (1990)