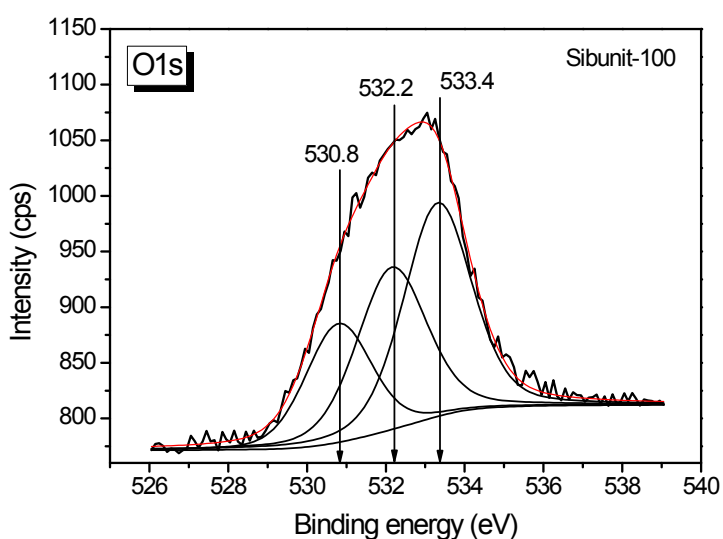


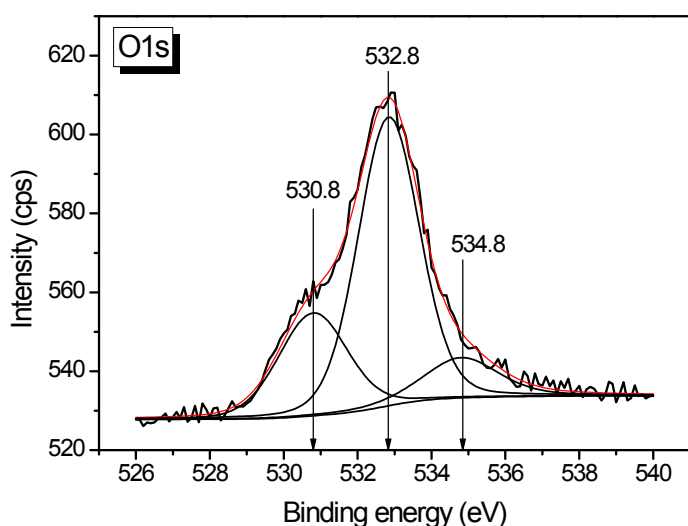
Controlled synthesis of PVP-based carbon supported Ru nanoparticles: synthesis approaches, characterization, capping agent removal and catalytic behavior

I.L. Simakova^{1,2*}, Yu.S. Demidova^{1,2}, J. Glaesel³, E.V. Murzina⁴, T. Schubert⁵, I.P. Prosvirin¹, B. Etzold³, D.Yu. Murzin⁴

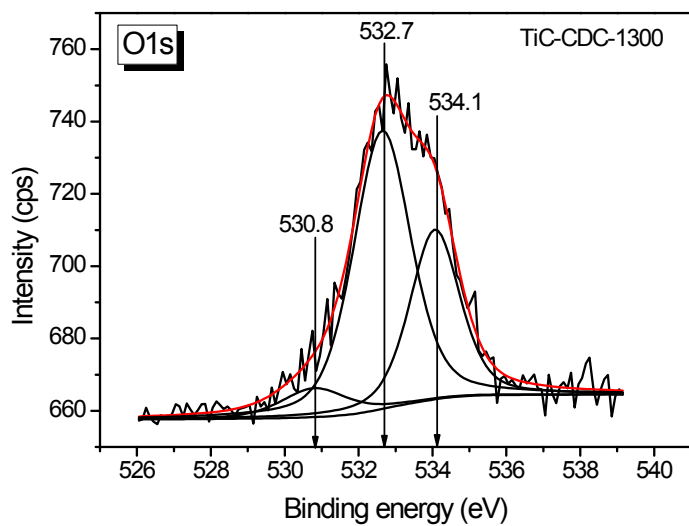
Supporting information



a

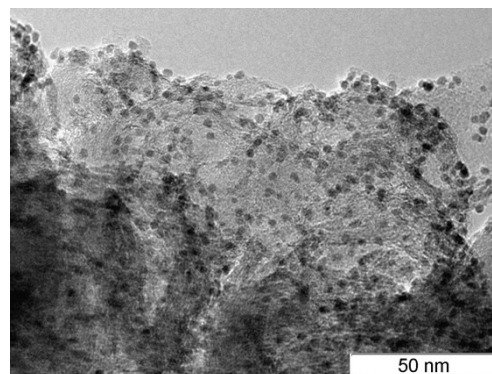
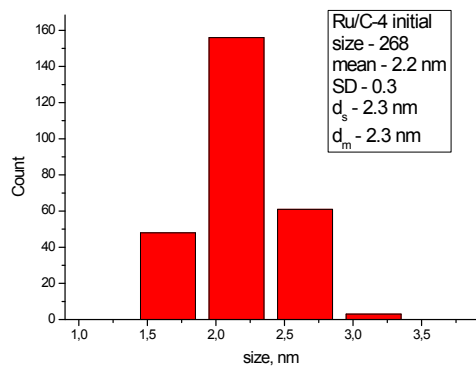


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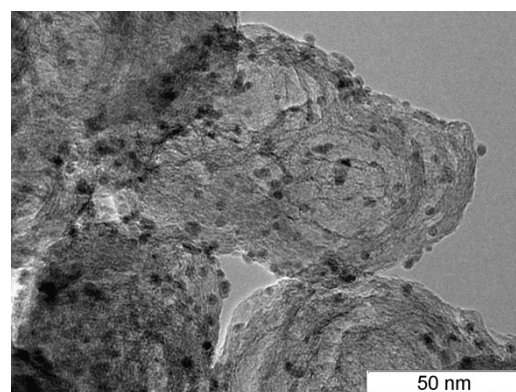
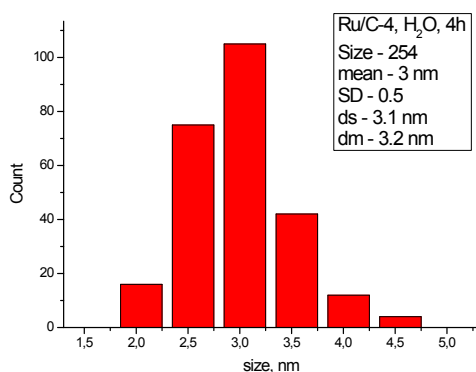


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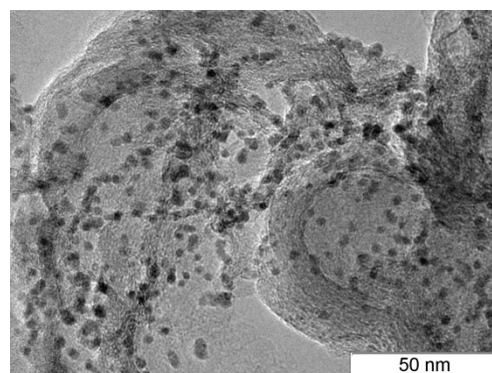
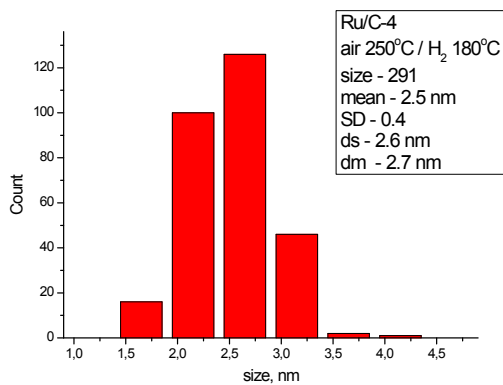
Fig. S1. XP spectra of O1s region of pristine Sibunit (a), CNF-PI (b) and TiC-CDC (c) carbon materials.



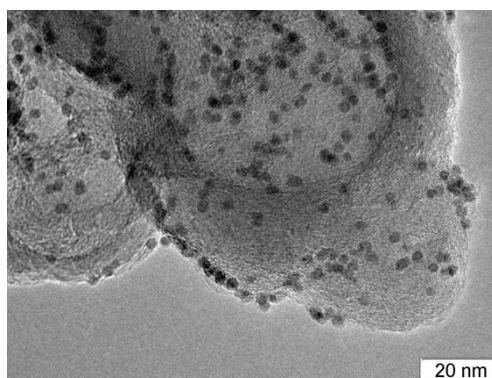
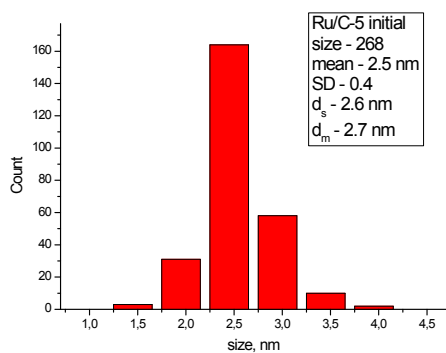
a



b

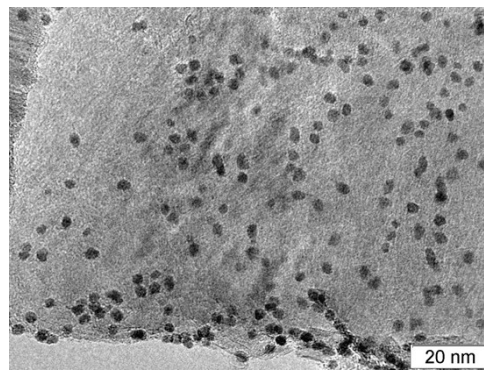
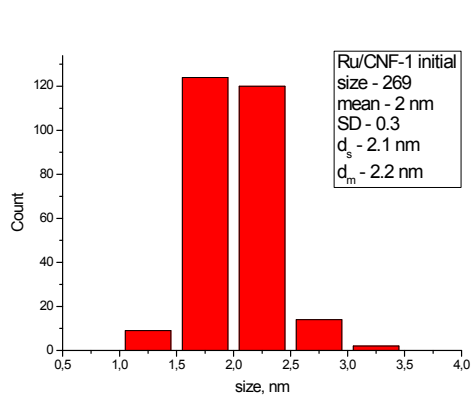


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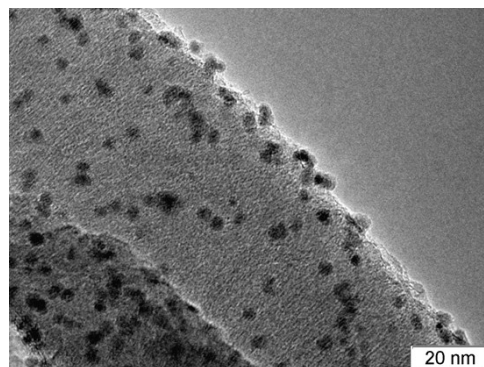
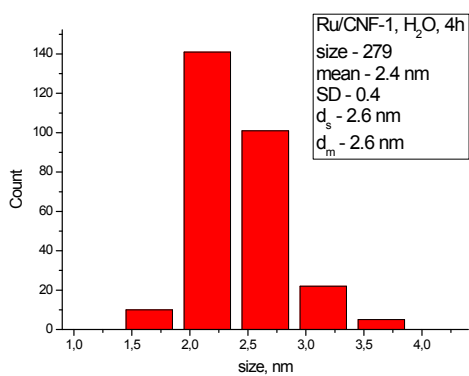


d

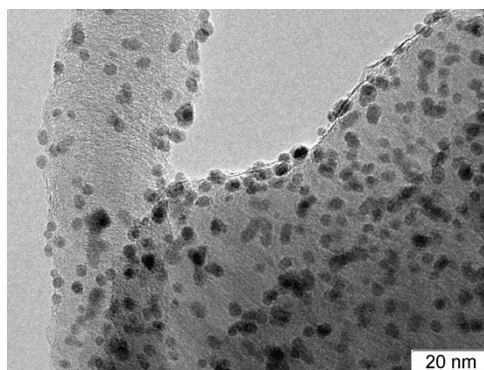
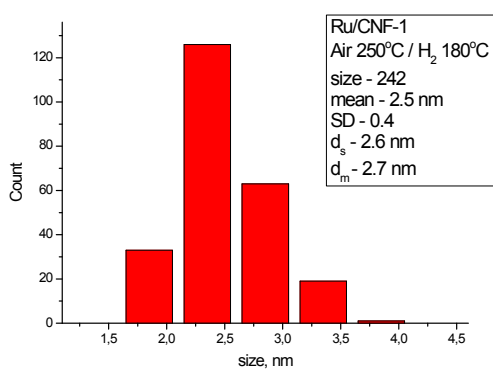
Fig. S2. Representative TEM images (right) and histograms of particles size distribution (left) of PVP-based Ru/Sibunit catalysts: a – Ru/C-4 initial; b - Ru/C-4, H₂O, 4 h; c - Ru/C-4, air, 180°C/H₂, 250°C; d - Ru/C-5 initial.



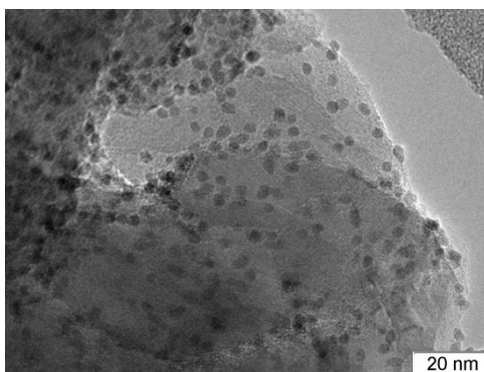
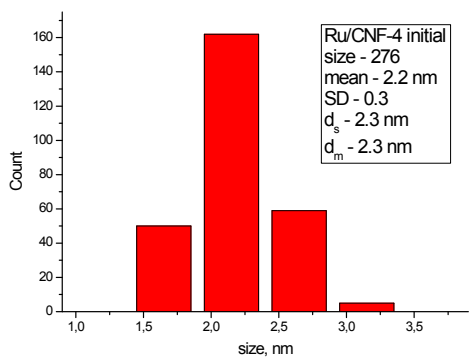
a



b

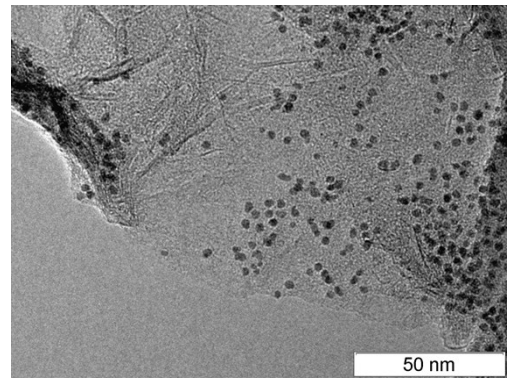
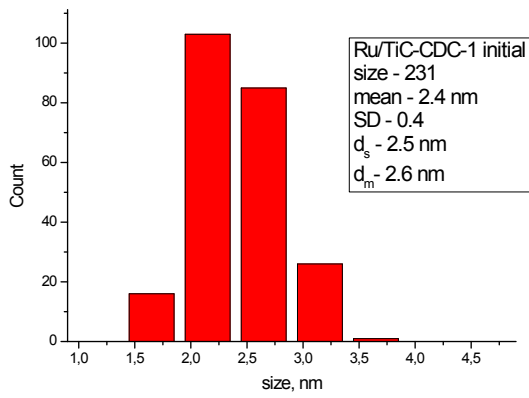


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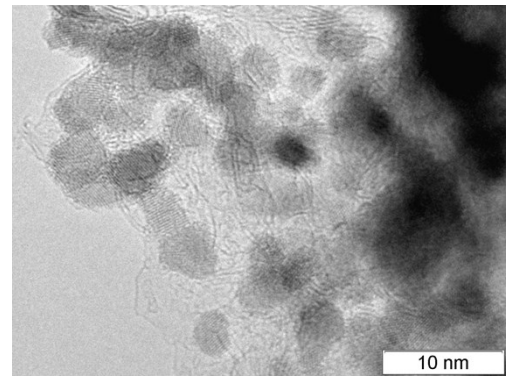
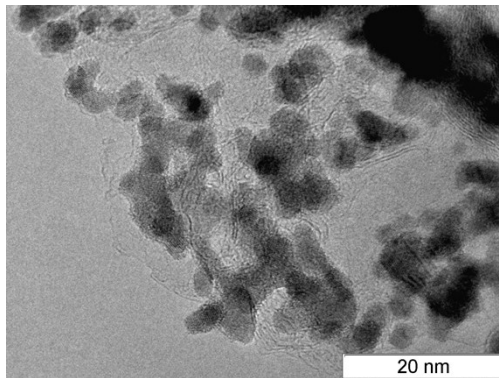


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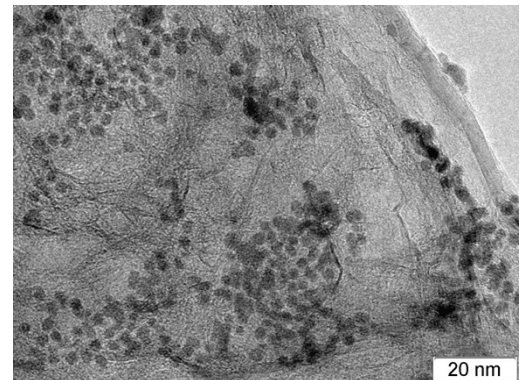
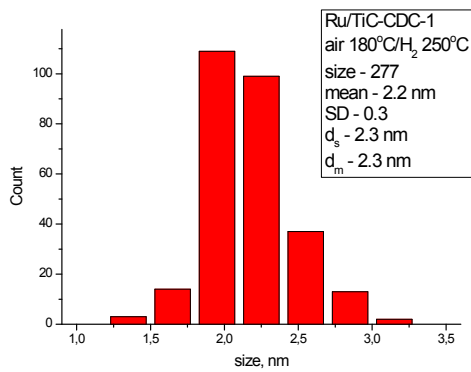
Fig. S3. Representative TEM images (right) and histogram of particles size distribution (left) of PVP-based Ru/CNF catalysts: a – Ru/CNF-1 initial; b - Ru/CNF-1, H₂O, 4 h; c - Ru/CNF-1, air, 180°C/H₂, 250°C; d - Ru/CNF-4 initial.



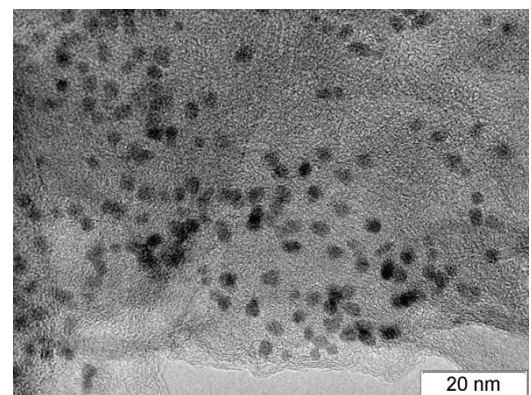
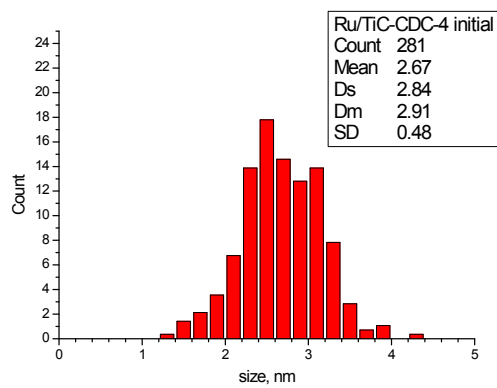
a



b



c



d

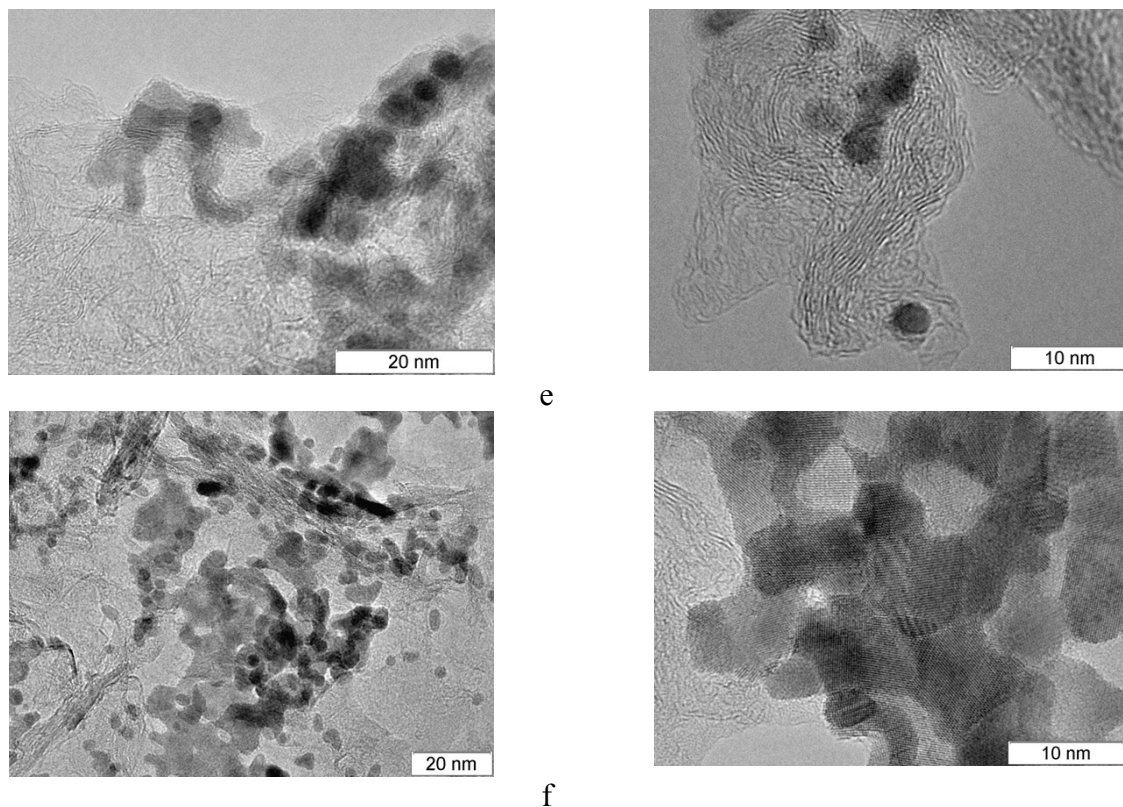


Fig. S4. Representative TEM images (right) and histogram of particles size distribution (left) of PVP-based Ru/TiC-CDC catalysts: a – Ru/TiC-CDC-1 initial; b - Ru/TiC-CDC-1, H₂O, 4 h; c - Ru/TiC-CDC-1, air, 180°C/H₂, 250°C; d – Ru/TiC-CDC-4 initial; e - Ru/TiC-CDC-4, H₂O, 4 h; f - Ru/TiC-CDC-4, air, 180°C/H₂, 250°C.

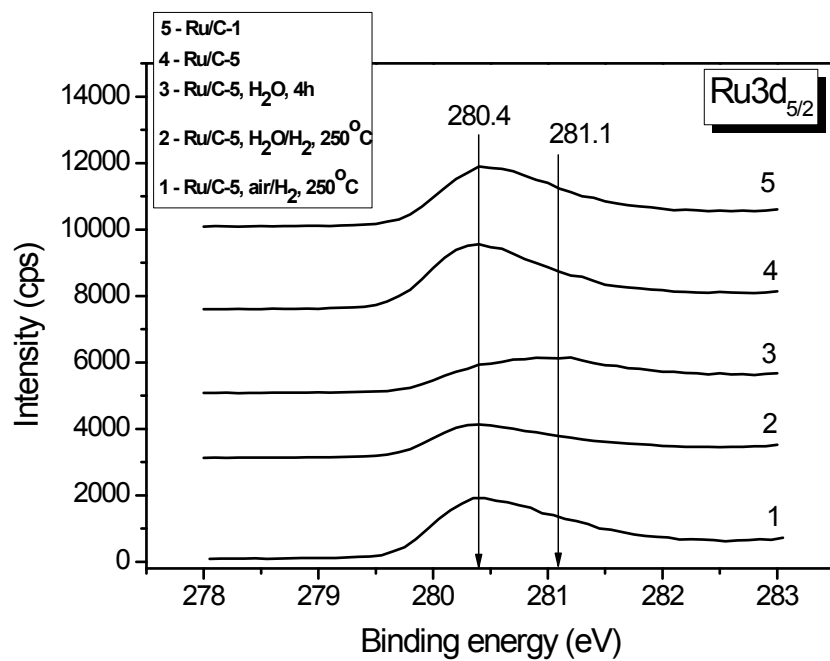


Fig. S5. XP spectra of Ru_{3d}_{5/2} region of Ru/C-1 and Ru/C-5 series: 1 – Ru/C-1; 2 - Ru/C-5; 3 – Ru/C-5, H₂O, 4h; 4 - Ru/C-5, H₂O/H₂, 250°C; 5 - Ru/C-5, air/H₂, 250°C.