

大阪大学公開ワークショップ
「ダブルディグリー・プログラムを考える」
2016/08/03 豊中キャンパス

OSAKA UNIVERSITY PUBLIC WORKSHOP

Irfan Dwi Aditya

Double Degree Program

Yoji Shibutani Laboratory

Department of Precision Science and Technology Osaka University

Department of Physics Institut Teknologi Bandung

I1

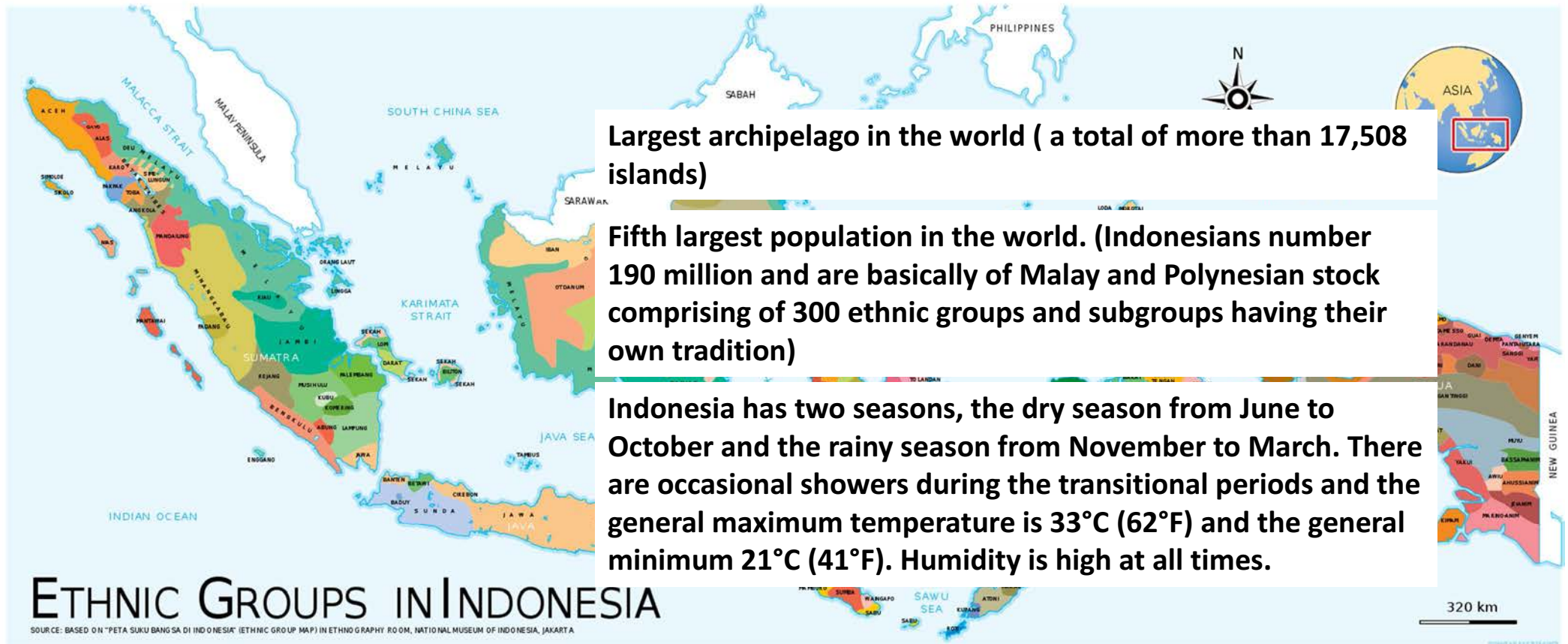
I2



Slide 2

- I1 IRFAN, 2016/06/21
- I2 4,808 km= 2,988 miles.
IRFAN, 2016/06/21

Indonesia



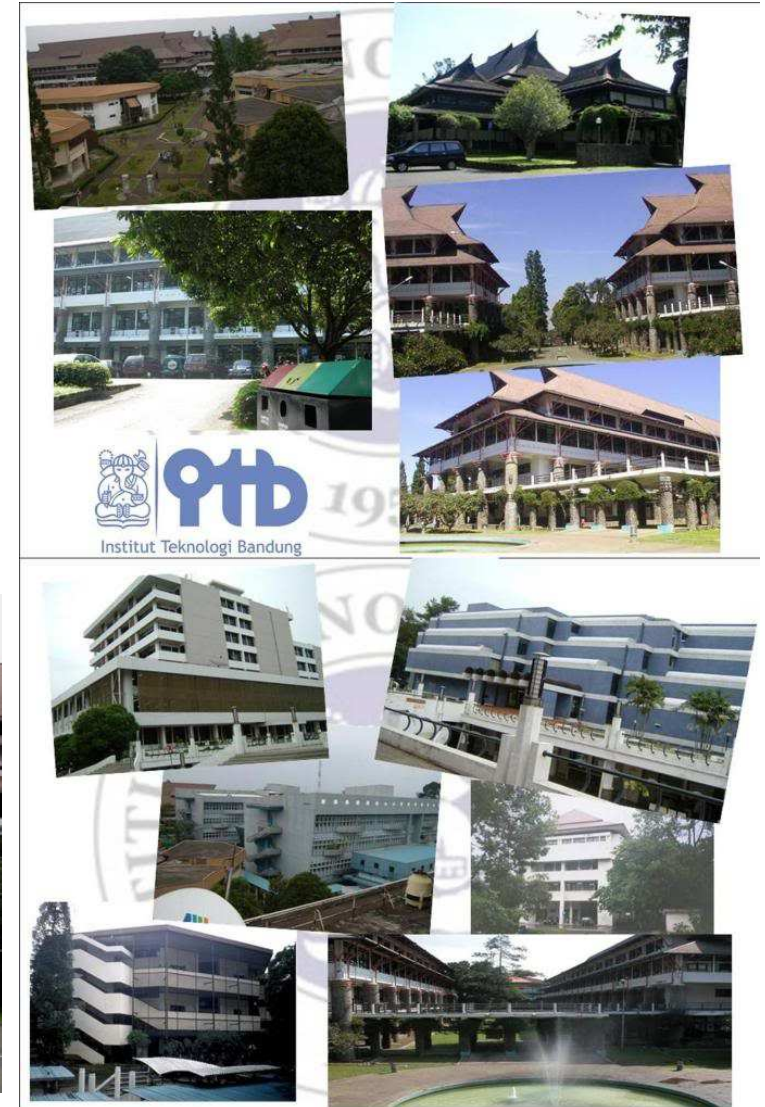
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Indonesia



A nighttime photograph of the main entrance of the National Sun Yat-sen Memorial Hall. The image shows a wide, paved courtyard with a central fountain area. On either side of the courtyard are large, multi-story buildings with traditional Chinese architectural features, including tiled roofs and wooden balconies. The buildings are brightly lit from within, and the courtyard is illuminated by streetlights. The overall scene is a well-maintained and historic public space.



Motivation To Join Double Degree Program at Osaka University

1. “Double Degree”
2. “One who treads a path in search of knowledge has his path to Paradise made easy by God.” – Prophet Muhammad (No.1 most influential people in the world chosen by Michael H. Hast, from the book 100 most influential people in the world)
3. “The world is a book and those who do not travel read only one page.” – St. Augustine of Hippo (early theologian and philosopher whose writings influenced the development of Western Christianity and Western philosophy)
4. “All travel has its advantages. If the passenger visits better countries, he may learn to improve his own. And if fortune carries him to worse, he may learn to enjoy it.” – Samuel Johnson : A Journey to the Western Islands of Scotland and The Journal of a Tour to the Hebrides
5. “No guts, no glory,” – "Die Hard: With a Vengeance" (1995).

- “Seek knowledge from the cradle to the grave.” – Prophet Muhammad
- “The world is a book and those who do not travel read only one page.” – St. Augustine
- “All travel has its advantages. If the passenger visits better countries, he may learn to improve his own. And if fortune carries him to worse, he may learn to enjoy it.” – Samuel Johnson, *A Journey to the Western Islands of Scotland and The Journal of a Tour to the Hebrides*

Research Activity

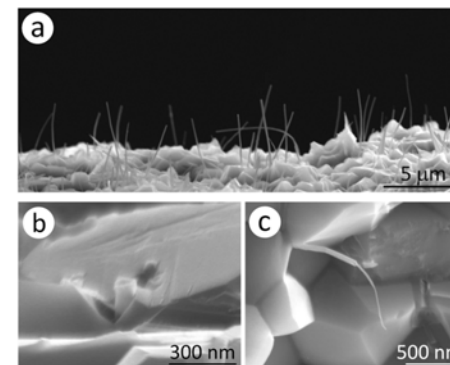
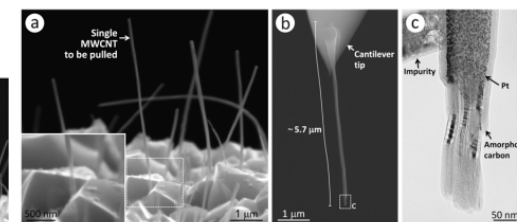
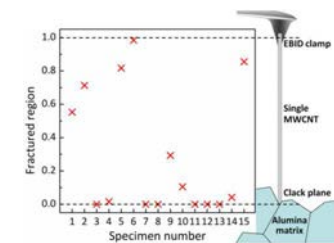
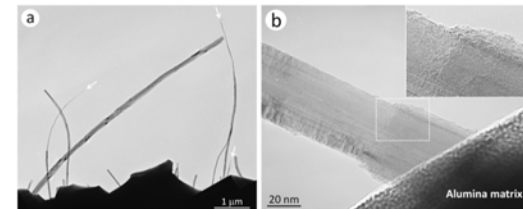
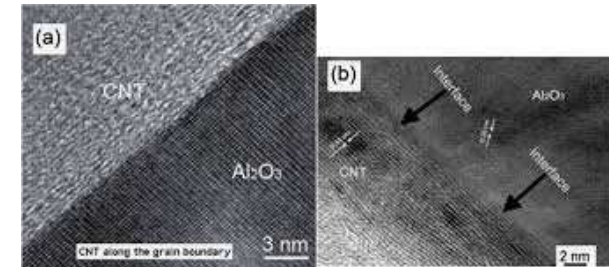
Motivation Background

- Enhanced mechanical properties

- Bending strength = 689.6 ± 29.1 MPa (Alumina : 330MPa)
- Fracture toughness = 5.90 ± 0.27 MPa·m^{1/2} (Alumina : 3.5 MPa·m^{1/2})

- CNT/Ceramics composites has strong load transfer .

- Explanation of interfacial nature between CNTs and the ceramics matrix is far from satisfactory.



, Go Yamamoto, Keiichi Shirasu, Toshiyuki Hashida, Toshiyuki Takagi Ji Won Suk, Jinho An, Richard D. Piner, Rodney S. Ruoff. Nanotube fracture during the failure of carbon nanotube/alumina composites.[Carbon,49,(2011),3709-3716]

G. Yamamoto, M. Omori, T. Hashida and H. Kimura,, A Novel Structure for Carbon Nanotube Reinforced Alumina Composites with Improved Mechanical Properties, Nanotechnology, 19, (2008), 315708-315714 (7pp)

Jiang D*, Zhang J, Lv Z, Multi-wall carbon nanotubes (MWCNTs)–SiC composites by laminated technology, Journal of the European Ceramic Society 32 (2012) 1419–1425

First-principles study of Interfacial Interaction between Carbon Nanotube and Al_2O_3 (0001)

Abstract

The calculation result shows that the binding energy of CNT and clean Al_2O_3 (0001) decrease as the diameter of CNT increase. The structures of the CNT and Al-terminated Al_2O_3 (0001) do not drastically change from those before adsorbing. Carbon atoms of CNT interacted with the topmost aluminum atom of Al_2O_3 (0001) by forming covalent bonding. In the case of the O-terminated Al_2O_3 (0001), small-diameter CNTs have strong interaction, which comes from opening of CNTs catalytically induced by the O-terminated surface and the subsequent formation of mixed covalent-ionic bonding between carbon and oxygen atoms.

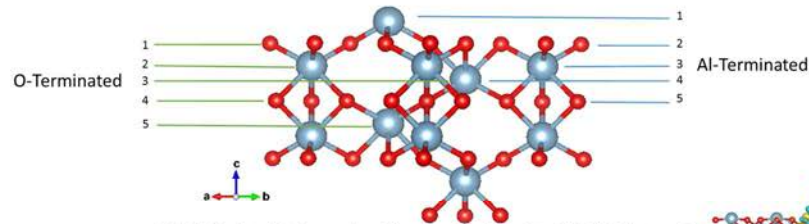
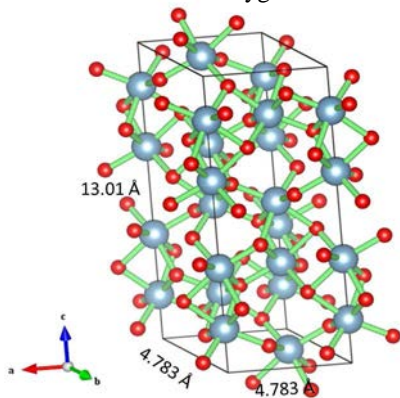
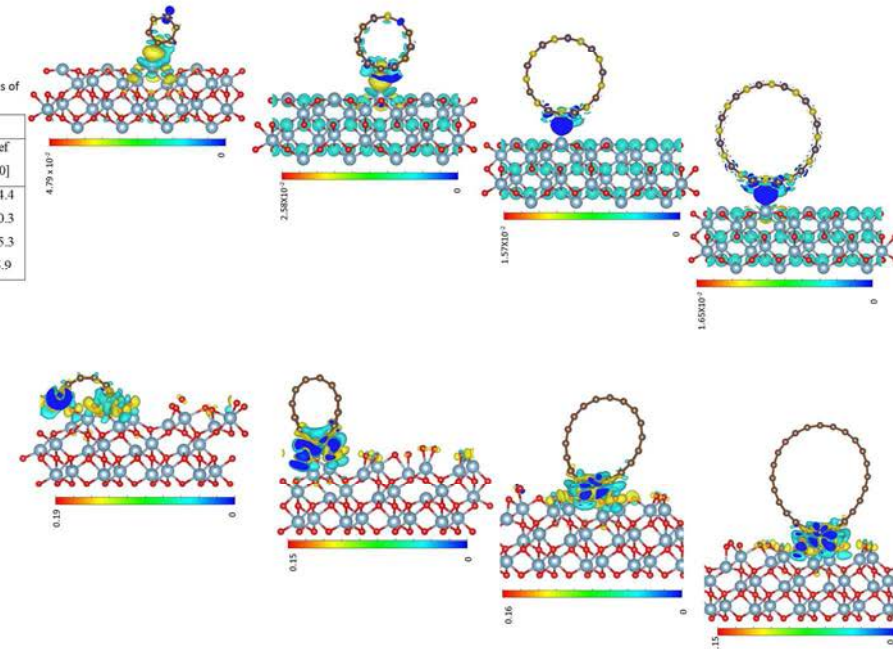
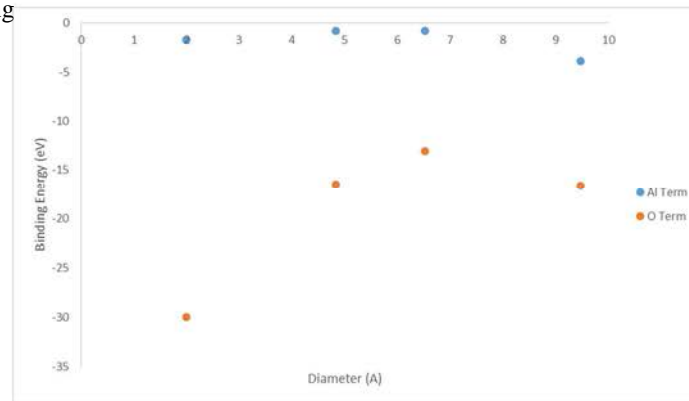


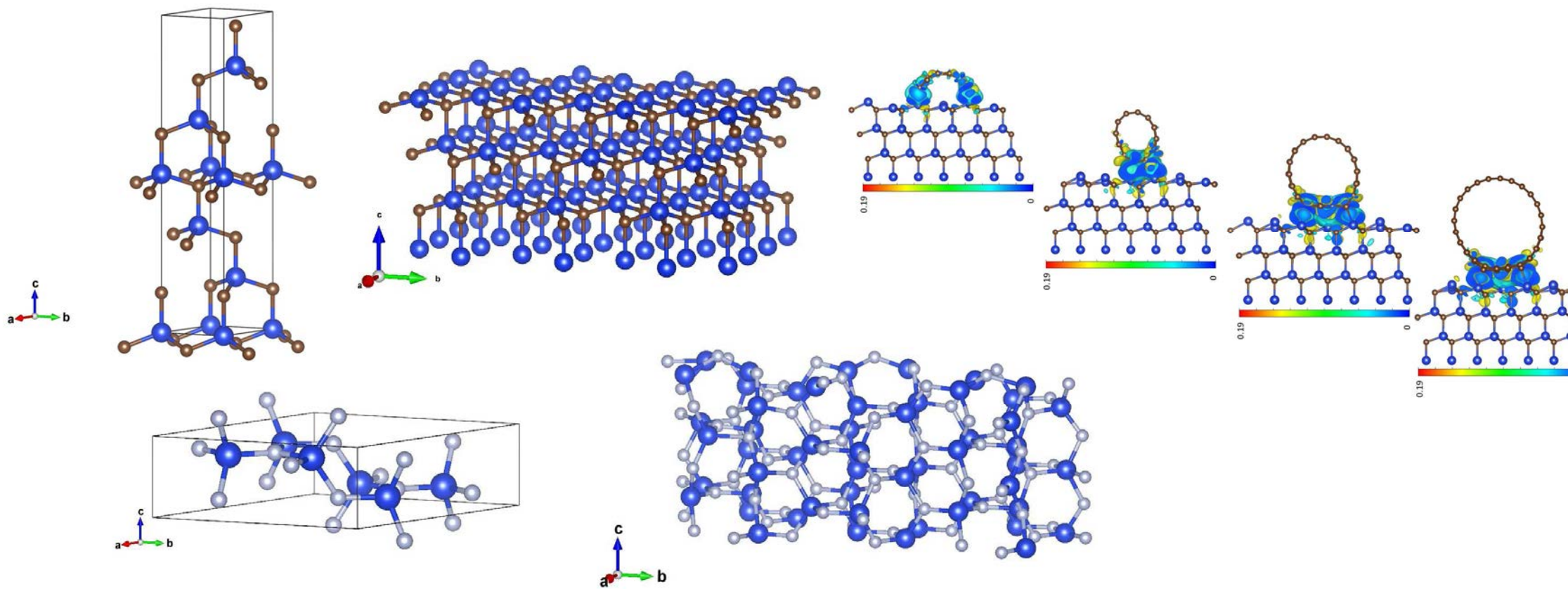
TABLE I. Relaxation of interlayer spacings of Al-terminated and O-terminated Al_2O_3 (0001) in terms of percent of the bulk geometry spacings

	Al Terminated					O Terminated			
	This work	Ref [34]	Ref [35]	Ref [36]	Ref [37]	This work	Ref [38]	Ref [39]	Ref [40]
$\Delta d_{12}(\%)$	-82.3	-84.5	-85.5	-87.4	-82	-7.6	-13.2	-7.2	-14.4
$\Delta d_{23}(\%)$	+6.25	+3.5	+3.2	+3.1	+7	-8.6	-6.9	-1.5	-10.3
$\Delta d_{34}(\%)$	-43	-45.8	-45.4	-41.7	-52	+11.4	+13.5	+7.3	+15.3
$\Delta d_{45}(\%)$	+18.5	+19.4	+19.8	+18.9	+25	-1.9	-7.7	-0.6	-5.9

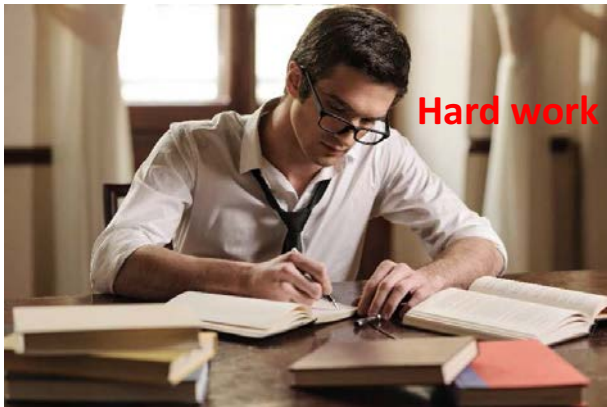


Published soon.

Future Works



My Experience During the Program





Thank you for your attention

