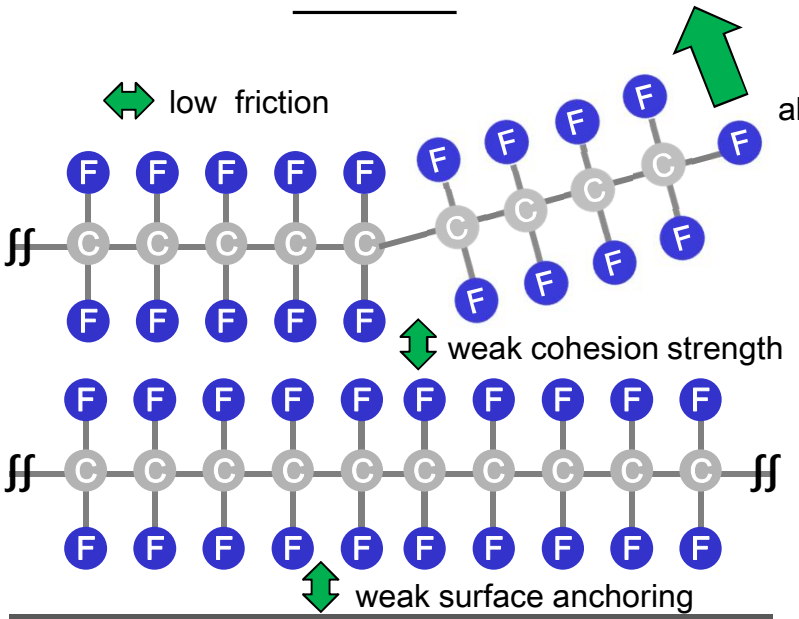
Cross-linked PTFE for Bearing

TACONIC

2015

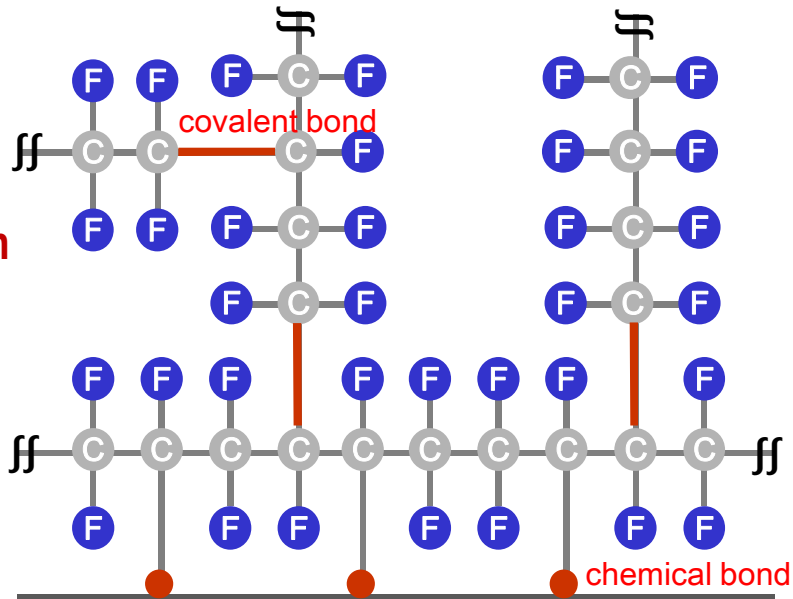
Why Cross-linked PTFE?

PTFE



Electron beam irradiation under special conditions

Cross-linked PTFE



(+) superior thermal resistance
(+) superior chemical resistance
(+) good electrical insulation
(+) low friction coefficient

(-) poor wear resistance
(-) creep deformation
(-) weak adhesion strength to a substrate

Mw ↑
3-dimentional network

(+) improved wear resistance
(+) increased PV value
(+) improved adhesion strength to a substrate

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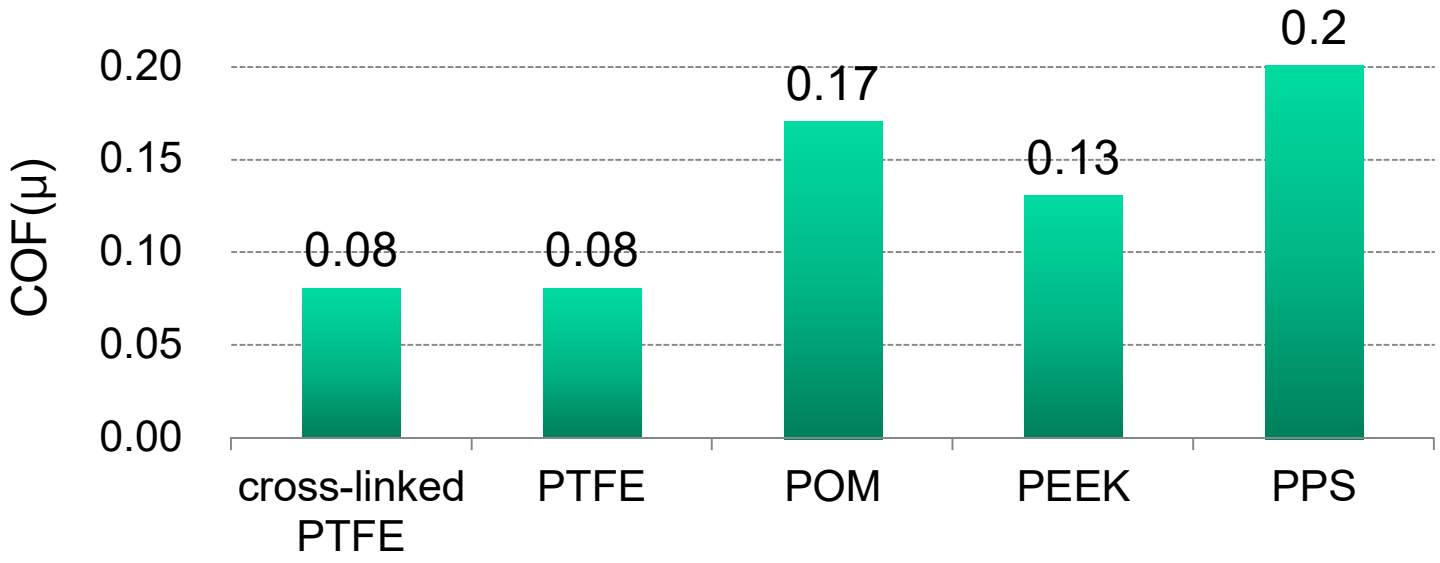
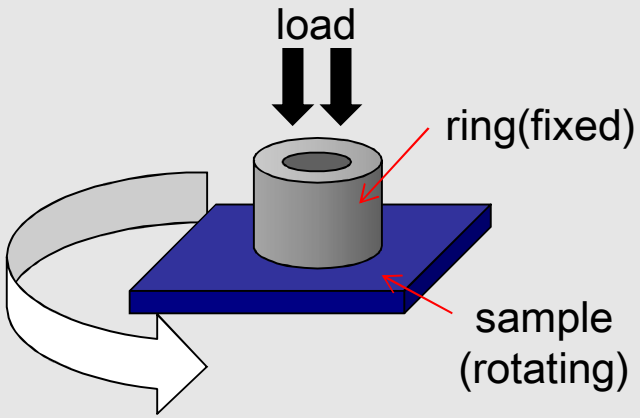
Cross-linked PTFE

Friction Coefficient

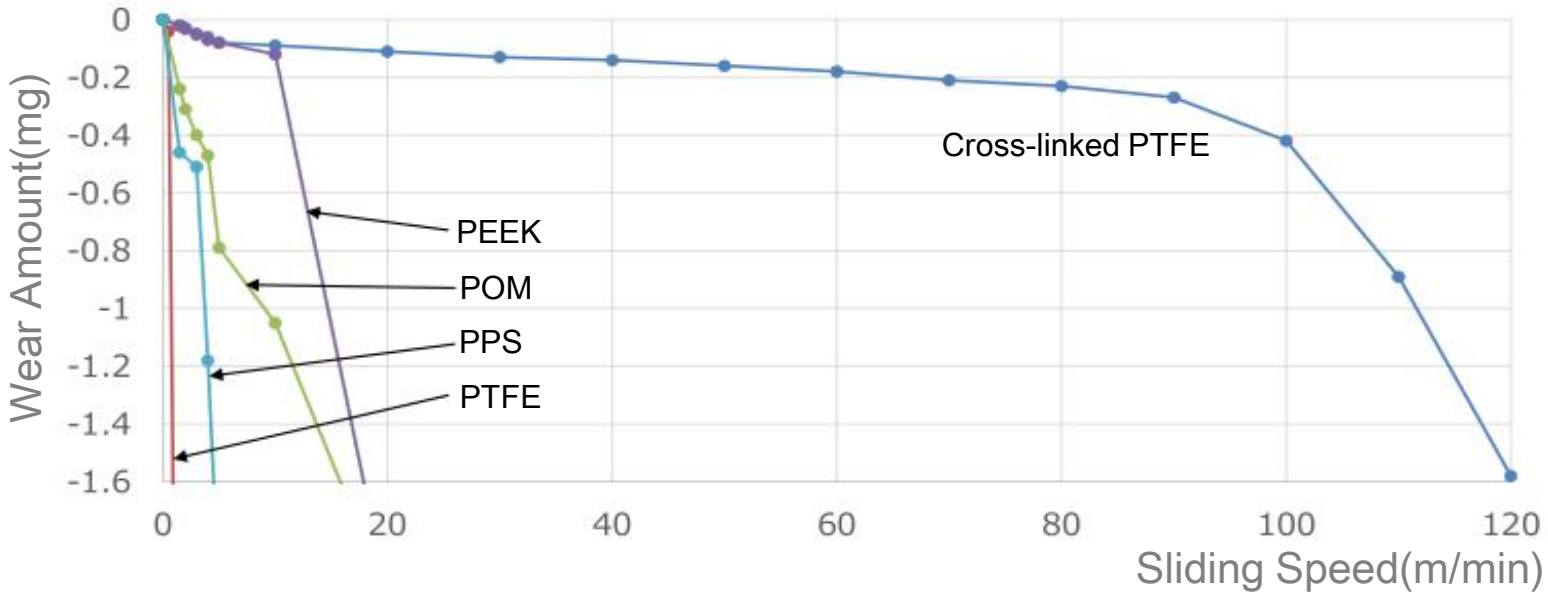




- ring on disc method
- counter-material S45C(Ra 0.28μm)
- ring OD Ø11.6, ID Ø7.4
- load 10MPa

Cross-linked PTFE

Wear Performance (load 10MPa / speed up)

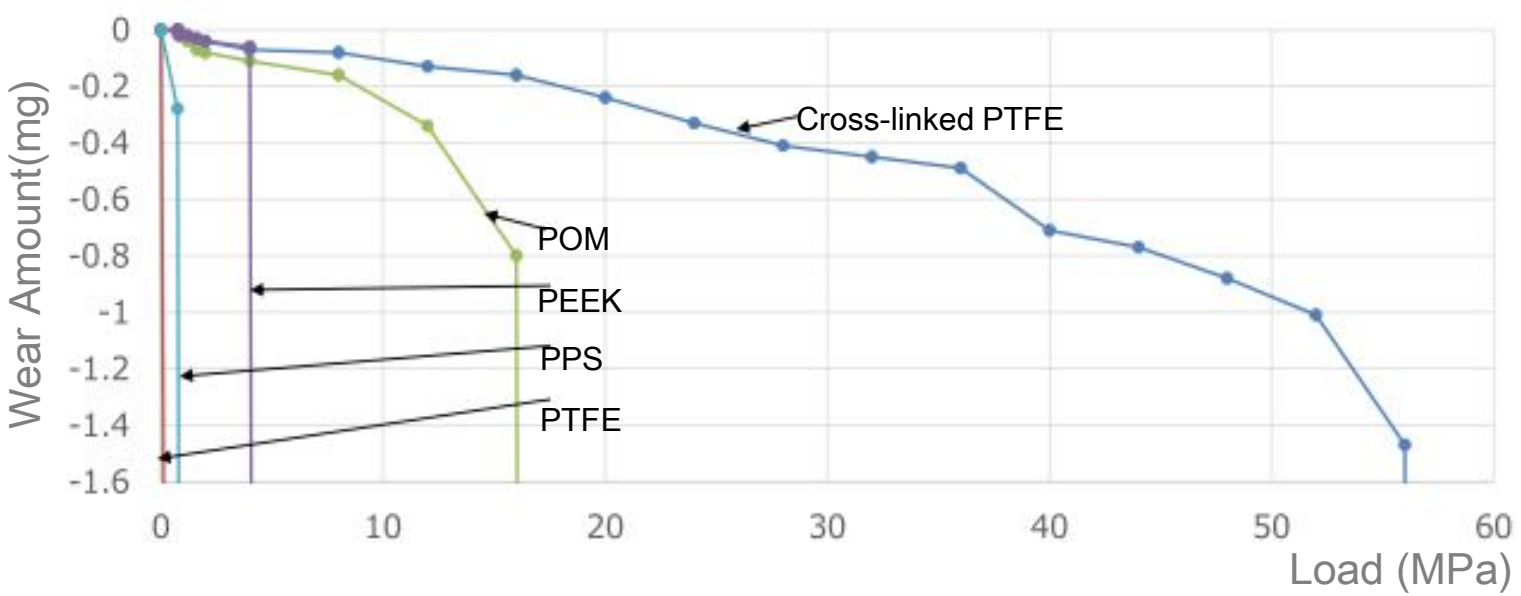


Material	PV Value (MPa · m/min)
cross-linked PTFE	1200
PTFE	5
PPS	50
POM	100
PEEK	100

- ring on disc method
- counter-material S45C(Ra 0.28μm)
- ring OD Ø11.6, ID Ø7.4
- load 10MPa

Cross-linked PTFE

Wear Performance (speed 25m/min / load up)

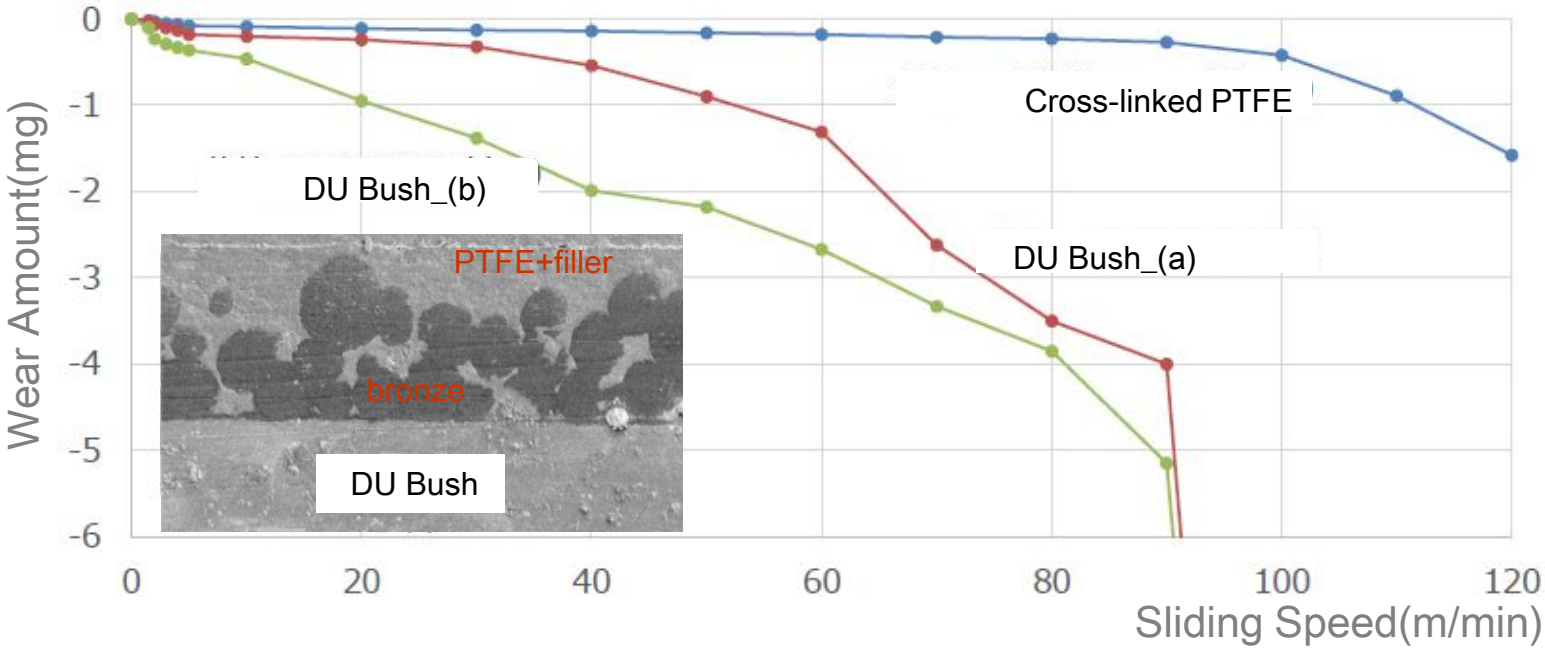


Material	PV Value (MPa · m/min)
cross-linked PTFE	1400
PTFE	-
PPS	19
POM	400
PEEK	100

- ring on disc method
- counter-material S45C(Ra 0.28μm)
- ring OD Ø11.6, ID Ø7.4
- sliding speed 25m/min

Cross-linked PTFE vs. DU Type

Wear Performance (load 10MPa / speed up)

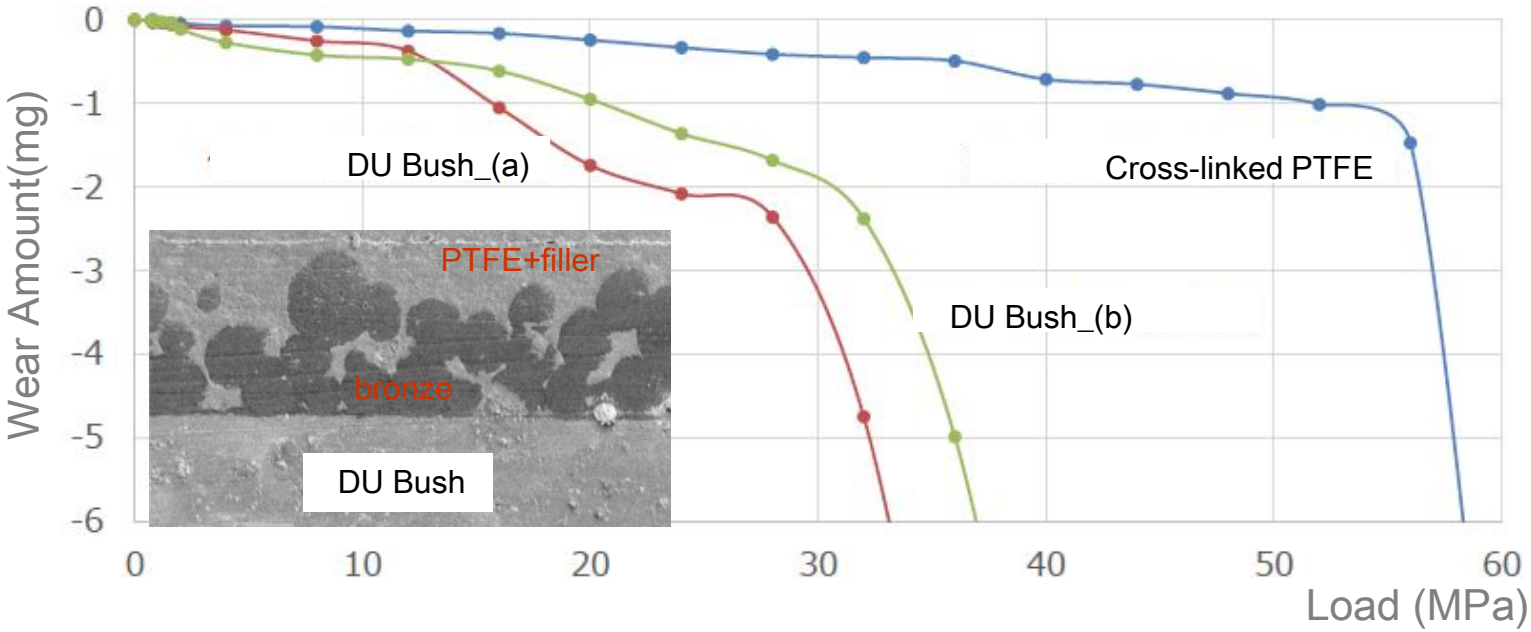


Material	PV Value (MPa · m/min)
cross-linked PTFE	1200
DU Bush_(a)	900
DU Bush_(b)	900

- ring on disc method
- counter-material S45C(Ra 0.28㎛)
- ring OD Ø11.6, ID Ø7.4
- load 10MPa

Cross-linked PTFE vs. DU Type

Wear Performance (speed 25m/min / load up)

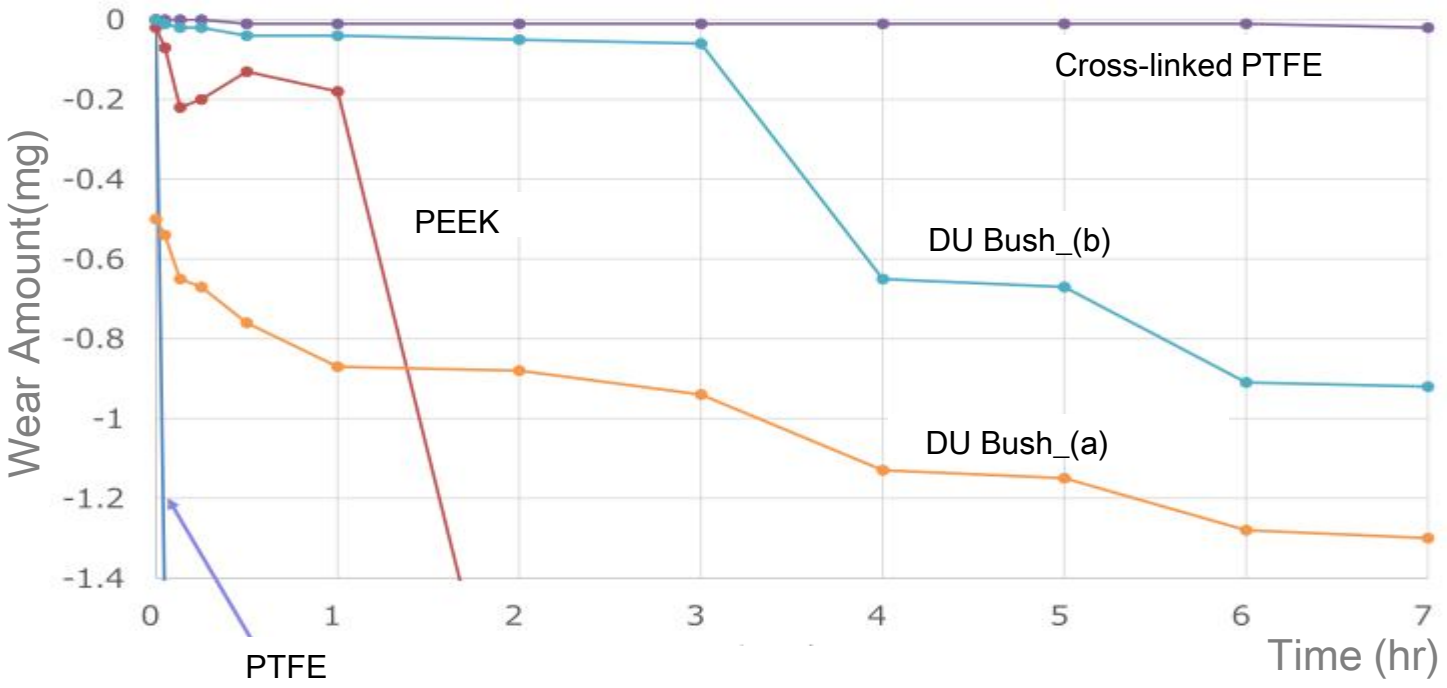


Material	PV Value (MPa · m/min)
cross-linked PTFE	1400
DU Bush_(a)	800
DU Bush_(b)	900

- ring on disc method
- counter-material S45C(Ra 0.28㎛)
- ring OD Ø11.6, ID Ø7.4
- sliding speed 25m/min

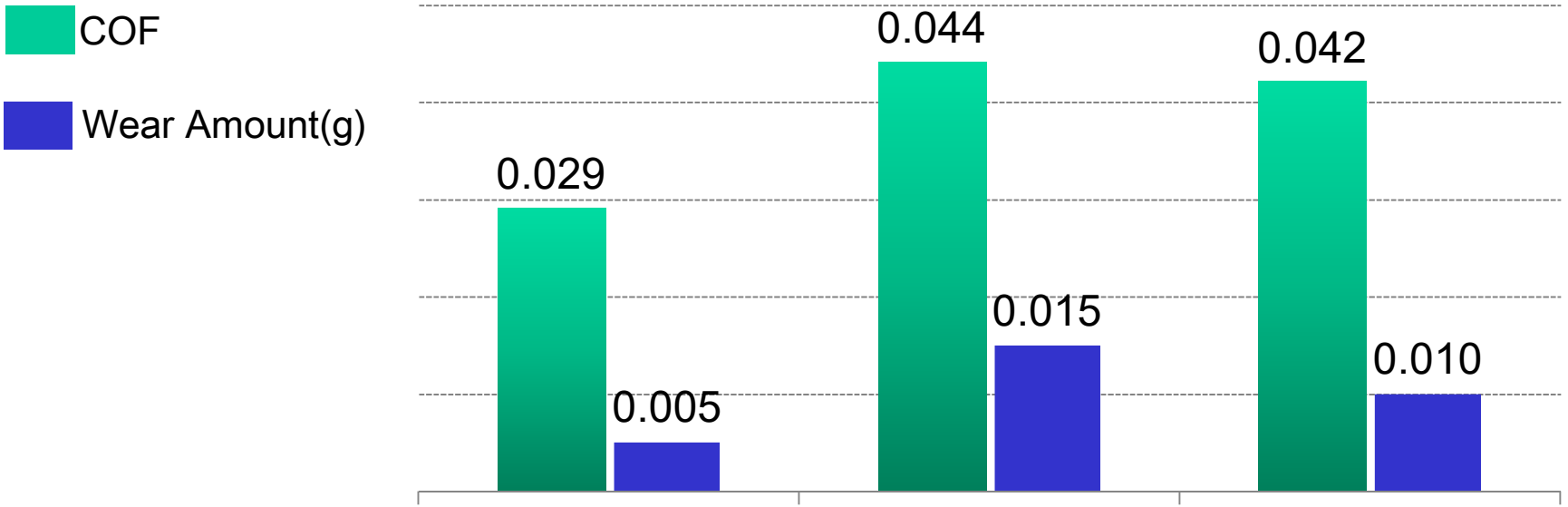
Cross-linked PTFE vs. DU Type

Wear Performance (load 1MPa / speed 100m/min)



- ring on disc method
- counter-material S45C(Ra 0.28㎛)
- ring OD Ø11.6, ID Ø7.4
- sliding speed 100m/min
- load 1MPa

Cross-linked PTFE vs. Filled PTFE



	Cross-linked PTFE	Filled PTFE (Taconic)	Filled PTFE (competitor)
PTFE thickness(μm)	75	200	250

- pin on disc method
- counter-material S45C(Ra 0.28μm)
- load 4MPa, speed 0.2m/s

Advantages & Applications

Cross-linked PTFE …

- higher PV value than virgin PTFE or filled PTFE
- excellent wear resistance without inorganic or metallic fillers
- improved adhesion strength to a substrate(steel, aluminum, etc.)
- relatively thin and uniform thickness of wear layer

- can replace DU bush materials
- can replace filled PTFE materials in some cases