

**Possibilities of Russian manufacturers to
promote the fulfillment of development
programs of direct current equipment in
Russian electric power industry
(Regarding power semiconductor
components)**

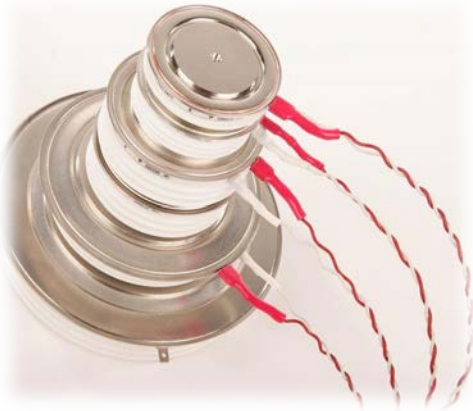
A.M. Surma

Proton-Electrotex



BASIC SEMICONDUCTOR DEVICES FOR HIGH-VOLTAGE KEYS OF DIRECT CURRENT EQUIPMENT

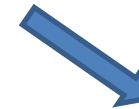
High-voltage disc thyristors



High-voltage IGBT-keys adapted for work in series connection



StakPak



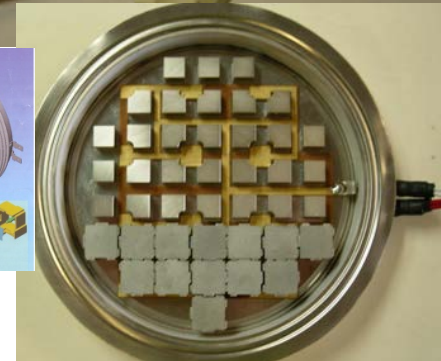
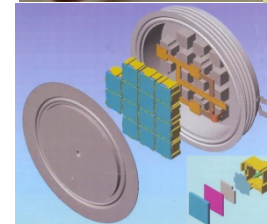
Press-pack



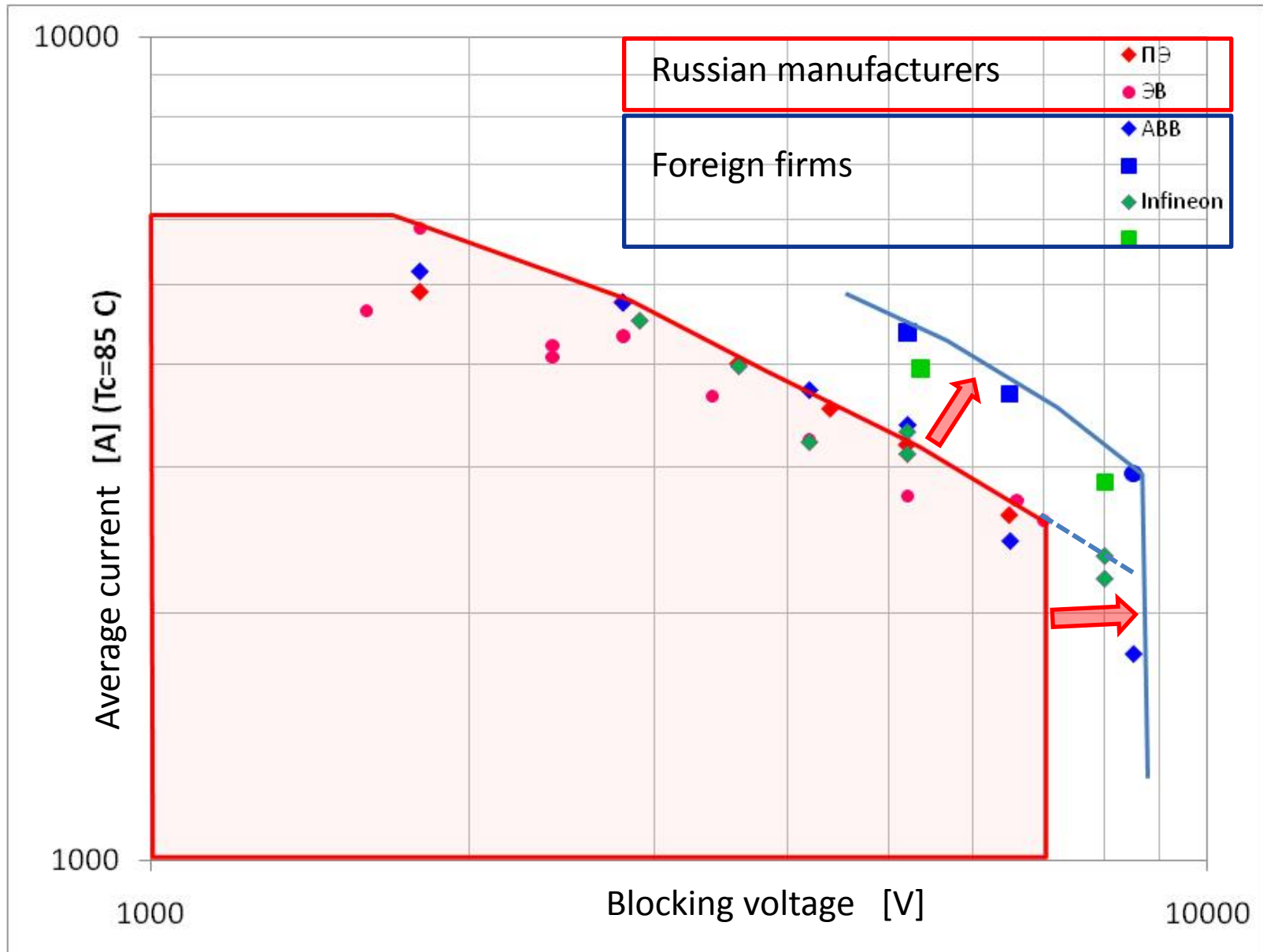
Light-triggered thyristors



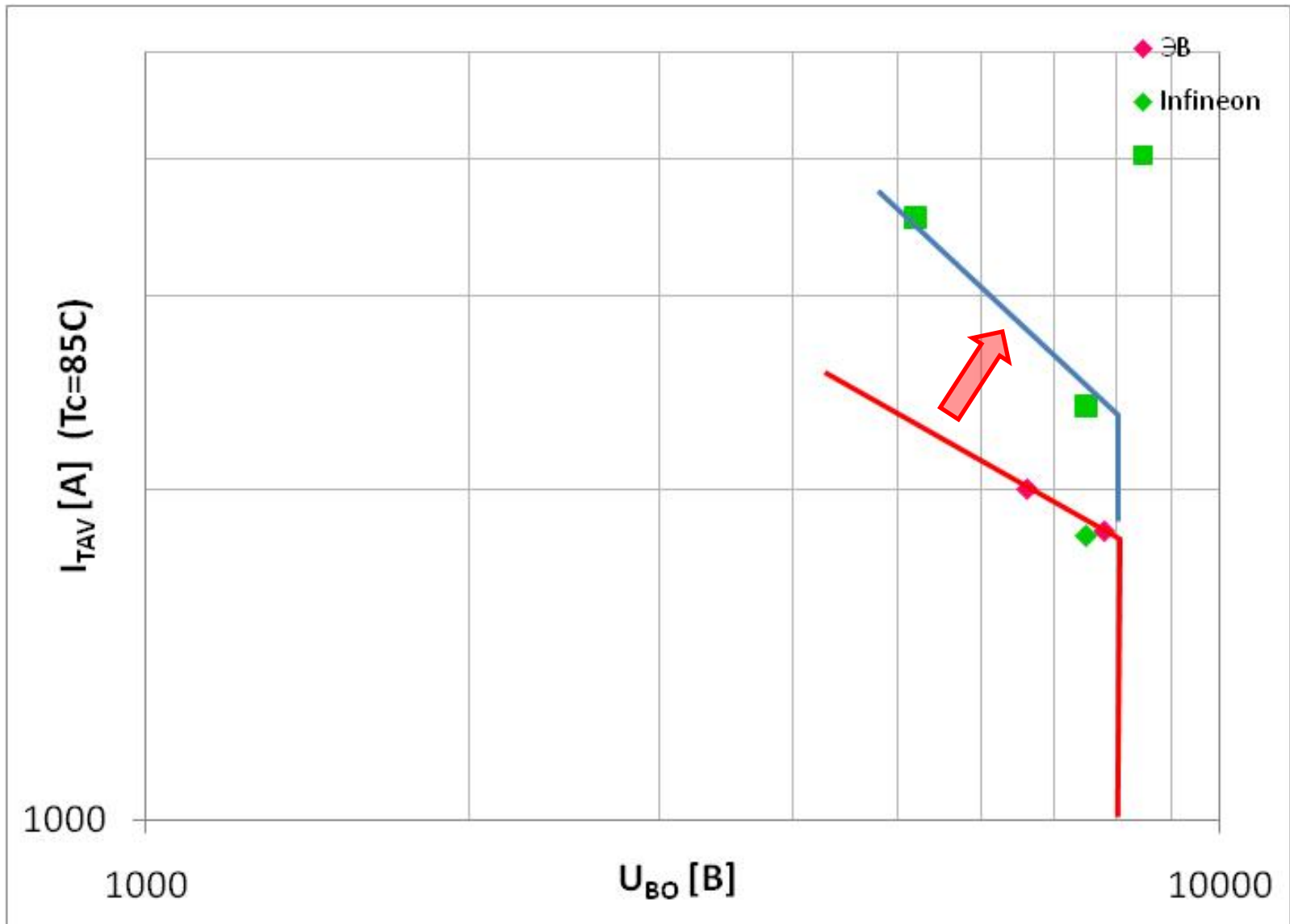
StakPak Subunit
(„Submodule“)



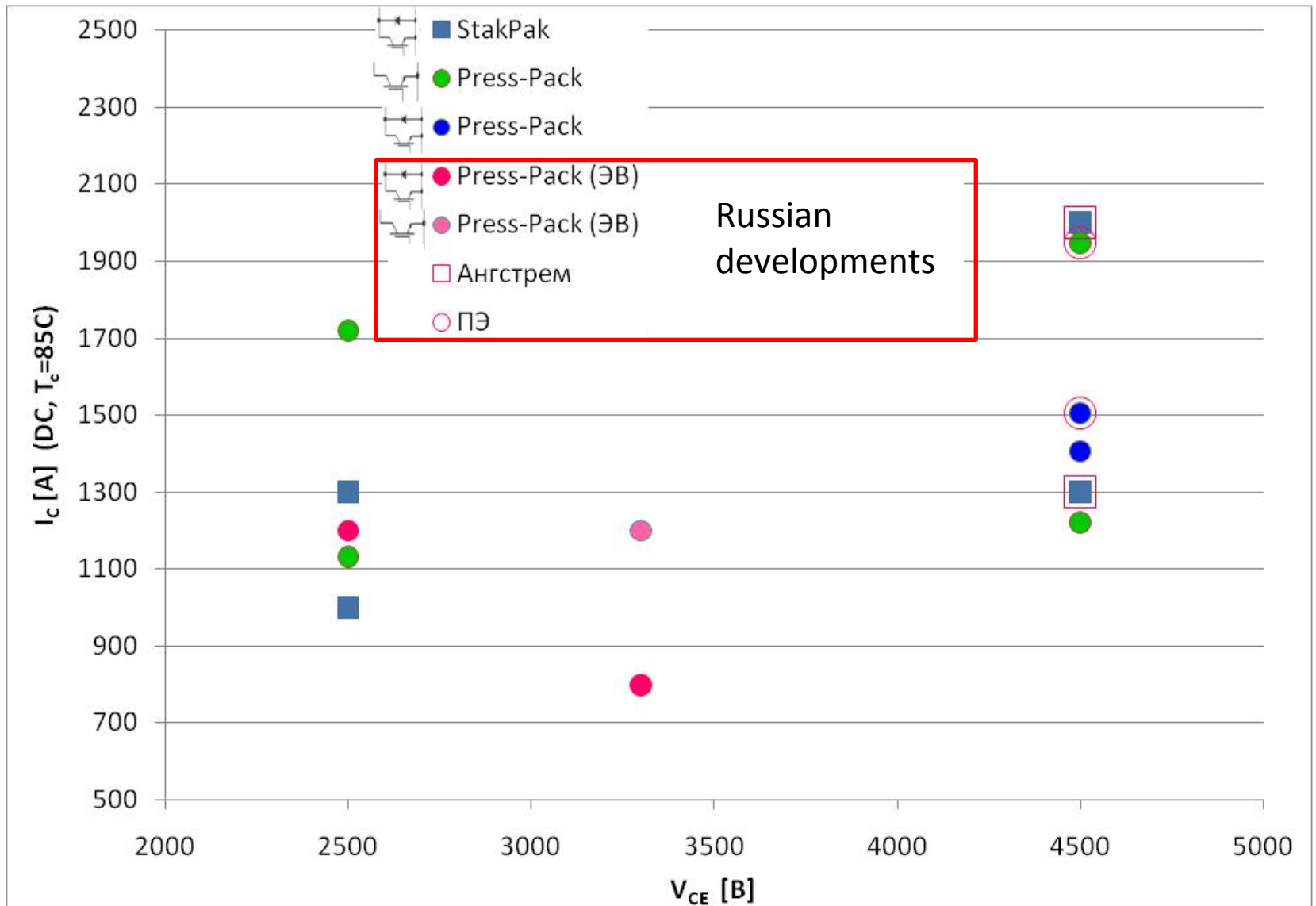
High-voltage and high-current thyristors



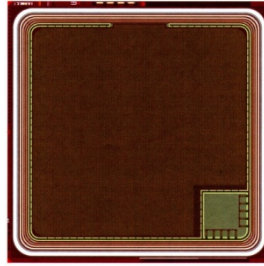
Light-triggered thyristors



High-voltage IGBT-keys adapted for work in series connection



Silicon chips for high-voltage IGBT keys



ABB

Ангстрем

IGBT

Type	Size mm	VCES (V)	IC (A)		Type	Size mm	VCES (V)	IC (A)
5SMX 12L2511	12.4 x 12.4	2500	50		AN60NPT25	13,6x13,6	2500	60
5SMY 12M3300	13.6 x 13.6	3300	62.5		AN50NPT33	13,6x13,6	3300	50
5SMY 12L4500	12.8 x 12.8	4500	42		AN30SPT45	13,6x13,6	4500	30
5SMY 12M4500	13.6 x 13.6	4500	50					
5SMY 12N4500	14.3 x 14.3	4500	55					
5SMY 12M6500	13.6 x 13.6	6500	31.25					

FWD

Type	Size mm	VRRM (V)	IF (A)		Type	Size mm	VRRM (V)	IF (A)
5SLX 12L2510	12.4 x 12.4	2500	100		AN120FDR25	13,6x13,6	2500	120
5SLY 12M3300	13.6 x 13.6	3300	125		AN100FDR33	13,6x13,6	3300	100
5SLY 12L4500	12.9 x 12.9	4500	84		AN60FDR45	13,6x13,6	4500	60
5SLY 12N4500	14.3 x 14.3	4500	110					
5SLX 12M6500	13.6 x 13.6	6500	50		AN50FDR65	13,6x13,6	6500	50

Conclusion

1. Base manufacturing techniques of power semiconductor devices for the direct current equipment in electric power industry basically are mastered by the Russian firms.
2. Concerning some devices with the maximum values of switching current and voltage today there is a backlog from leading foreign firms.
3. There are difficulties in development of a batch production of new generations devices.
4. Creation in Russia the guaranteed and stable consumption of power devices for the direct current equipment in electric power industry can become key action for elimination of the specified difficulties.