



# "Counter-Cure"

PROCESS TO DEVULCANIZE WASTE RUBBER

ECSER HOLDING CORP

US PATENTS 6,387,966 & 6,541,526



# EC ological SE condary R ubber

## ECSER

OZZY GUTMAN – VP BUSINESS DEVELOPMENT



***ECSER™ is an 'Eco-friendly' innovator in the field of rubber recycling, using an inexpensive, scalable, and non-toxic process to de-vulcanize rubber in a commercially viable manner.***

ECSER is based in New York City.

R & D Lab in Israel, with several PhD Chemists on staff.

ECSER Counter-Cure: an alternative to virgin rubber

**•CHEMICAL / MECHANICAL PROCESS**

*\*\* PATENTS ON BOTH \*\**

**•PROPRIETARY CHEMICAL REAGENT**

**•NON TOXIC**

**•CUSTOM MILLING REGIME**

**•COMMERCIALY VIABLE**

**•DESIGNED TO ENABLE CLIENT TO RUN PROCESS IN-HOUSE**

*US PATENTS 6,387,966 & 6,541,526*



# COUNTER – CURE TECHNOLOGY

COMMERCIAL OBJECTIVE:

TO ENABLE MANUFACTURERS TO DEVULCANIZE  
WASTE RUBBER IN- HOUSE ON EXISTING  
MACHINERY

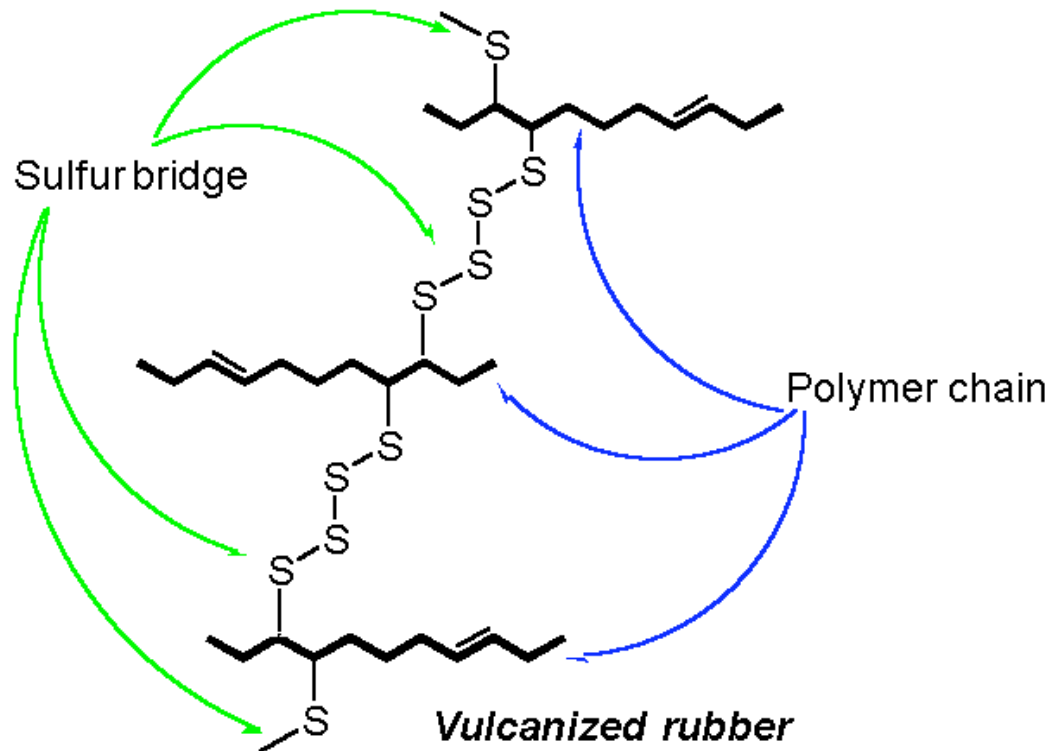
RESULTING IN A MATERIAL THAT CAN BE USED AS A  
PRIMARY REPLACEMENT FOR VIRGIN RUBBER  
SIGNIFICANT SAVINGS OVER THE COST OF VIRGIN

*US PATENTS 6,387,966 & 6,541,526*



# COUNTER – CURE TECHNOLOGY

*TARGET: ATTACK THE CROSSLINKS AT THERE WEAKEST POINT WITHOUT DAMAGING THE CARBON POLYMER CHAIN*





# COUNTER – CURE TECHNOLOGY

VALENCE BOND ANALYSIS DETERMINES THAT THE WEAKEST POINT IS THE CARBON-TO-SULFUR BOND.

VALENCE BOND TYPE	BOND SITE	BOND MAGNITUDE 'kcal/mol'	BOND POLARITY 'electron-volt'
C - C	Main polymer chain	83.6	0
C - S	Vulcanization bridge	59.6	0.3
S - S	Vulcanization bridge	62.2	0

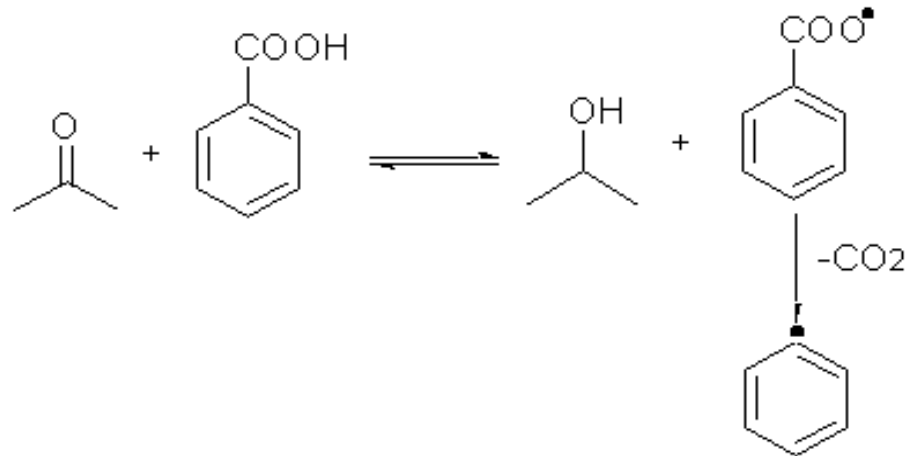


# COUNTER – CURE TECHNOLOGY

ECSEH DEVELOPED 'COUNTER-CURE' REAGENT TO ATTACK C-S BONDS.

- REAGENT IS NON TOXIC AND 'USER FRIENDLY'; COMPATIBLE WITH ORGANIC COMPONENT OF RUBBER MIXTURES; MIXES WELL AND HAS FUNCTIONAL SHELF LIFE

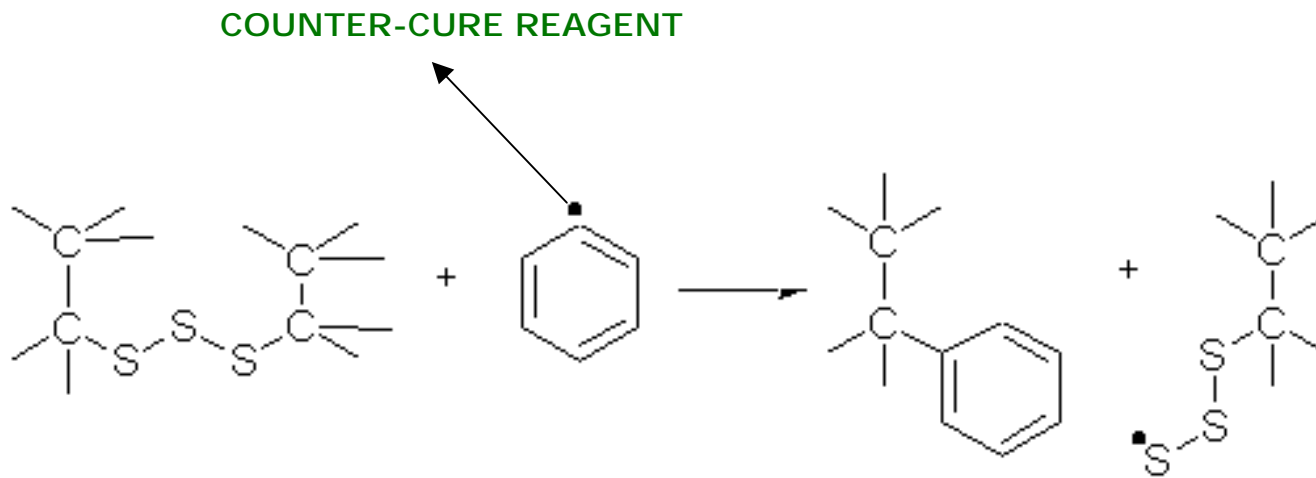
A mix of a QUINONE group and BENZOIC ACID creates a BENZOYL RADICAL





# COUNTER – CURE TECHNOLOGY

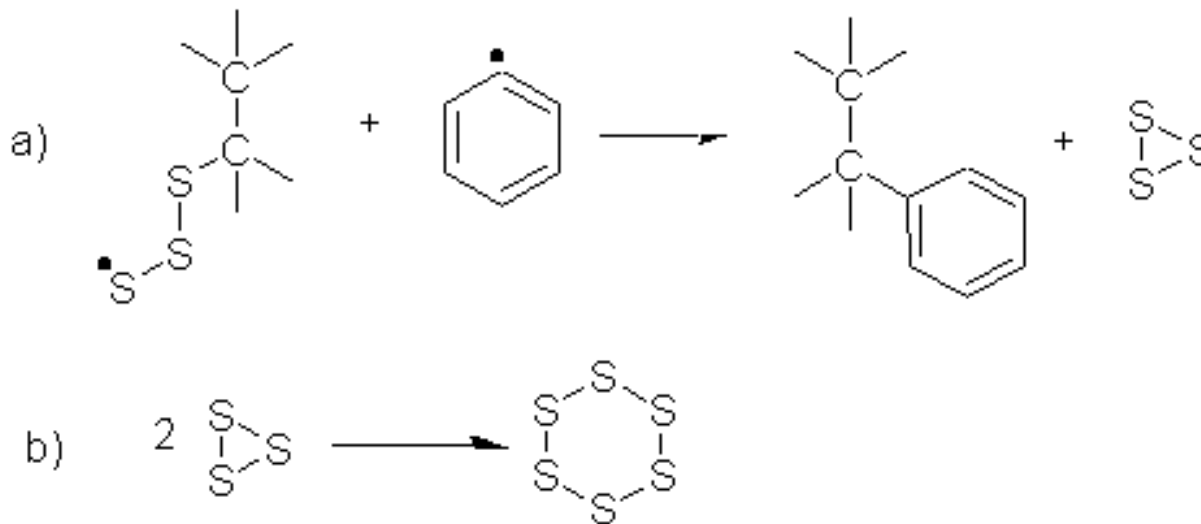
THE BENZOYL RADICAL UNDER AMBIENT TEMPERATURE SELECTIVELY ATTACKS A TRANSVERSE SULFUR BOND AND SEVERS THE BOND AT ITS WEAKEST POINT

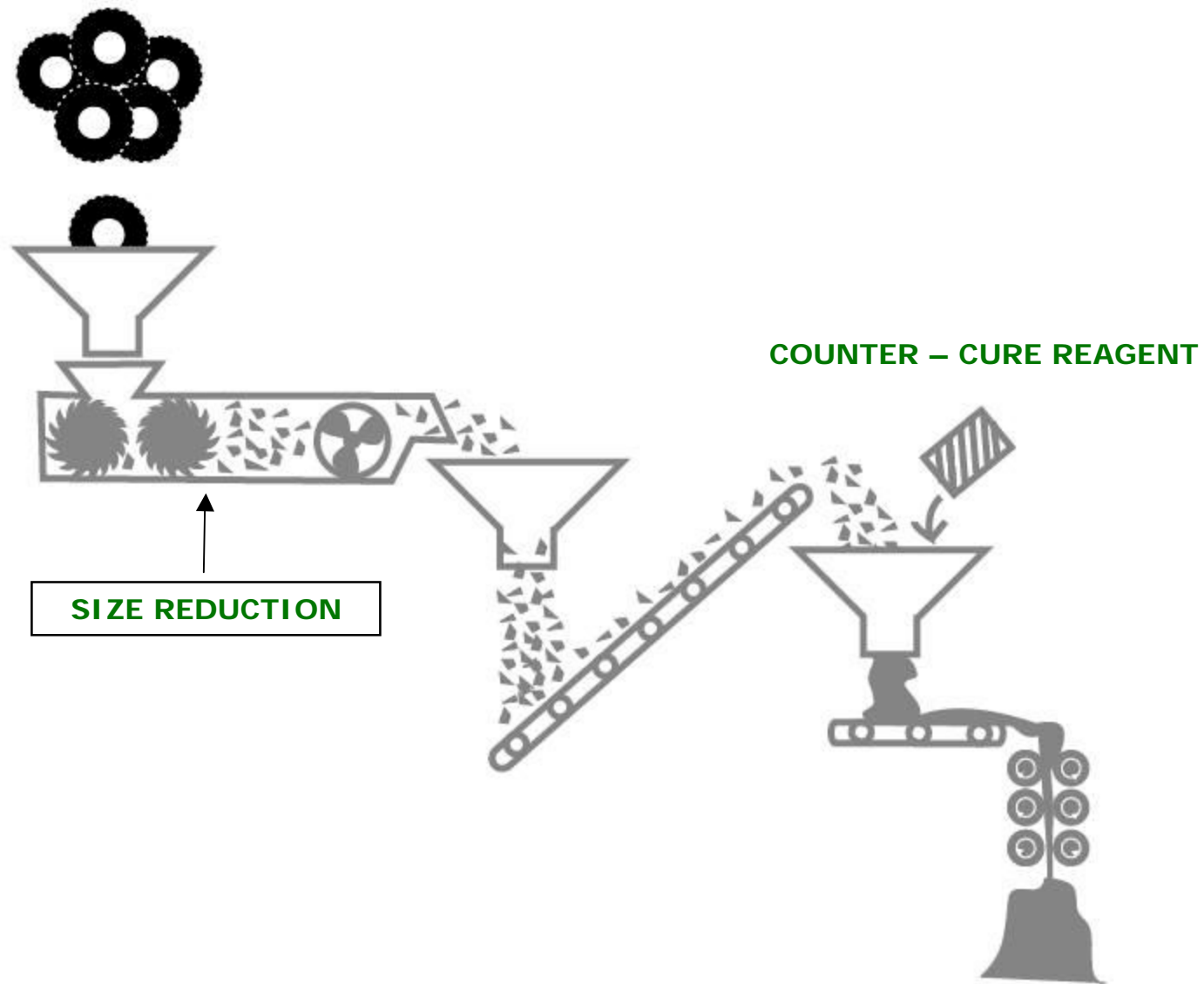




# COUNTER – CURE TECHNOLOGY

REAGENT FURTHER INHIBITS CARBON-SULFUR BONDS FROM RECONNECTING BY COMBINING THE BENZOYL RADICAL WITH THE MACRORADICAL. FREE SULFUR IS SEPARATED FROM THE MACRORADICAL AND REMAINS IN THE MIXTURE





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# The "ECSER" Solution

