Технологии походов

Как наука помогает делать экипировку лучше?

10-1

$T=\frac{1}{f}$ $\omega=\frac{2\pi}{T}=2\pi f$ $F=-kx$ $\omega=\sqrt{\frac{k}{m}}$ $T=2\pi\sqrt{\frac{m}{k}}$

$U(t)=\frac{1}{2}kx^2$ $K(t)=\frac{1}{2}mv^2$ $E_{Tot}=U+K$

$F_d=-bv$ $x(t)=x_m e^{-bt/2m}\cos(\omega' t+\phi)$ $\omega'=\sqrt{\frac{k}{m}-\frac{b^2}{4m^2}}$ $E(t)\approx\frac{1}{2}kx_m^2 e^{-bt/m}$ $PE=mgh$

critical damp $b^2=4km$

under damped $b^2<4km$

over damped $b^2>4km$

$T=2\pi\sqrt{\frac{L}{g}}$ simple pend

$\omega_d=\omega$ resonance

$T=2\pi\sqrt{\frac{I}{mgh}}$ physical pend

$y(x,t)=y_m\sin(kx-\omega t)$ wave in pos direction

$v(t)=-\omega x_m\sin(\omega t+\phi)$ $a(t)=-\omega^2x(t)$

$x(t)=x_m\cos(\omega t+\phi)$

$k=\frac{2\pi}{\lambda}$ $v=\frac{\omega}{k}=\frac{\lambda}{T}=\lambda f$ $v=\sqrt{\frac{\tau}{\mu}}$ $\mu=\frac{mass}{length}$ $P_{avg}=\frac{1}{2}\mu v\omega^2y_m^2$

resonance $\lambda=\frac{2L}{n}$ $n=1,2,3$

$f=\frac{v}{\lambda}=\frac{nv}{2L}$ $n=1,2,3..$

$v=\sqrt{\frac{B}{\rho}}$ Bulk modulus

$\Delta P_m=v\rho\omega s_m$ displacement / pressure

$P_m^2=2\rho vI$

$P_m=v\rho\omega s_m$

$f=\frac{v}{\lambda}=\frac{nv}{2L}$ $n=1,2,3$ Pipe 2 open ends displacement antinode pressure node

$f_{beat}=|f_1-f_2|$

$I=\frac{Power}{Area}=\frac{P_s}{4\pi r^2}$

$f=\frac{nv}{4L}$ $(n=1,3,5)$ Pipe 1 open end displacement antinode at open, node at closed

Interference

$\frac{\Delta L}{\lambda}=0,1,2$ fully constructive

$\phi=\frac{\Delta L}{\lambda}2\pi$ $I=\frac{1}{2}\rho v\omega^2s_m^2$

$\sin\theta=\frac{v}{v_s}$ $\frac{v_s}{v}$ = mach #

$I_0=1\times10^{-12}$

$\frac{\Delta L}{\lambda}=0.5,1.5,2.5$ fully destructive

$B=3\alpha$ $Q=C\Delta T$ Heat capacity $f'=f\frac{v\pm v_d}{v\mp v_s}$ $B=(10)\log\frac{I}{I_0}$

$\Delta L=L\alpha\Delta T$ $\Delta V=V\beta\Delta T$

$T_F=\frac{9}{5}T_C+32$

$Q=cm\Delta T$ specific heat

$Q=L_m$ Heat of transformation

$W=\int_{V_i}^{V_f}p\,dV$

$\log\frac{x}{y}=\log x-\log y$

$\log_a x=y \iff a^y=x$

$\Delta E_{int}=Q_{in}-W_{out}$ $P_{cond}=\frac{Q}{t}=kA\frac{T_H-T_C}{L}$

$n=\frac{molecules}{6.02\times10^{23}}$ $R=\frac{L}{k}$

Multi Slab $P_{cond}=\frac{A(T_H-T_C)}{\sum L/k}$

$P_{radiation}=\sigma\varepsilon AT^4$ emissivity $P_{net}=P_{abs}-P_{rad}$

$5.67\times10^{-8}\frac{W}{m^2K^4}$ $P_{abs}=\sigma\varepsilon AT_{env}^4$

Adiabatic $Q=0$ $\Delta E=-W$

Con Vol $W=0$ $\Delta E=Q$

closed cyc $\Delta E=0$ $Q=W$

Free exp $Q=W=0$ $\Delta E=0$ $\Delta T=0$

$PV=nRT$ $R=8.31\frac{J}{mol\cdot K}$

$W=nRT\ln\frac{V_f}{V_i}$ (isothermal)

$K_{avg}=\frac{3}{2}kT$ $1.38\times10^{-23}\frac{J}{K}$

M = molar mass $V_{rms}=\sqrt{\frac{3RT}{M}}$

$E_{int}=\frac{3}{2}nRT$ changes

$Q=nC_V\Delta T$ (constant Volume)

$Q=nC_p\Delta T$ (con press)

$W=p\Delta V=nR\Delta T$ (con press)

$\gamma=\frac{C_p}{C_V}$ $V_{avg}=\sqrt{\frac{8RT}{\pi M}}$

$T_iV_i^{\gamma-1}=T_fV_f^{\gamma-1}$ $P_iV_i^{\gamma}=P_fV_f^{\gamma}$ (adiabatic) $V_{mp}=\sqrt{\frac{2RT}{M}}$

$C_V=\frac{3}{2}R$ changes $C_V=C_p-R$ $\Delta E=\frac{3}{2}nR\Delta T$ changes

$\Delta E=nC_V\Delta T$

Free exp $P_iV_i=P_fV_f$

$\Delta S=\frac{|Q_H|}{T_H}-\frac{|Q_L|}{T_L}$

Deg of freedom

	Translation	rotation	Tot	C_V	C_p
monatomic	3	0	3	$3/2R$	$5/2R$
Diatomic	3	2	5	$5/2R$	$7/2R$
Polyatomic	3	3	6	$3R$	$4R$

$\Delta S=\int_i^f\frac{dQ}{T}$

$\Delta S=\frac{Q}{T}$ isothermal

$\Delta S=\frac{Q}{T_{avg}}$ Small ΔT

$\Delta S=nR\ln\left(\frac{V_f}{V_i}\right)+nC_V\ln\frac{T_f}{T_i}$

engine

$W=|Q_H|-|Q_L|$ $\frac{|Q_H|}{T_H}=\frac{|Q_L|}{T_L}$

$\varepsilon=\frac{|W|}{|Q_H|}$ energy we get / energy we pay for

$\varepsilon_c=\frac{|Q_H|-|Q_L|}{|Q_H|}=1-\ldots$

Refrigerator $K=|Q_L|$ what we want

Polarization $I=I_0\cos^2\theta$

refraction $n_1\sin\theta_1=n_2\sin\theta_2$ $\frac{\lambda_1}{\lambda_2}=\frac{v_1}{v_2}$

$n=\frac{c}{v}$ $\lambda_n=\frac{\lambda}{n}$ $N_1=\frac{2Ln_1}{\lambda}$ $N_2=\frac{2Ln_2}{\lambda}$ N_2-N_1

critical angle $\theta_c=\sin^{-1}\frac{n_2}{n_1}$

Double slit $\Delta L=d\sin\theta$

$d\sin\theta=m\lambda$ $(0,1,2)$ maxima

$d\sin\theta=(m+\frac{1}{2})\lambda$ $(0,1,2)$ minima

phase shift off higher n

$I=4I_0\cos^2(\frac{1}{2}\phi)$ $\phi=\frac{2\pi d}{\lambda}\sin\theta$

Brewsters angle $\theta_B=\tan^{-1}\frac{n_2}{n_1}$

Thin film

$2L=(m+\frac{1}{2})\frac{\lambda}{n_2}$ $(m=0,1,2)$ maxima

$2L=\frac{m\lambda}{n_2}$ $(m=0,1,2)$ minima

Single slit diffraction

$\Delta y=\frac{L\lambda}{d}$ separation between fringes -slit width

$a\sin\theta=m\lambda$ $(m=1,2,3)$ minima

$I=I_m\left(\frac{\sin\alpha}{\alpha}\right)^2$ $\alpha=\frac{1}{2}\phi=\frac{\pi a}{\lambda}\sin\theta$

circular Diffraction

$\sin\theta=1.22\frac{\lambda}{d}$ first minimum, d aperture diameter

$\theta_R=1.22\frac{\lambda}{d}$ rayleigh criterion. if $\theta>\theta_R$ it is resolved.

Diffraction grating

$d\sin\theta=m\lambda$ $(m=0,1,2)$ maxima lines

slit separation

$\Delta\theta_{hw}=\frac{\lambda}{Nd\cos\theta}$ half width

$R=Nm$ resolving power

$D=\frac{m}{d\cos\theta}$ dispersion

Plane mirrors $i=-p$

Obj - S is pos if on same side as incoming light

Img - S' is pos if on same side of outgoing light

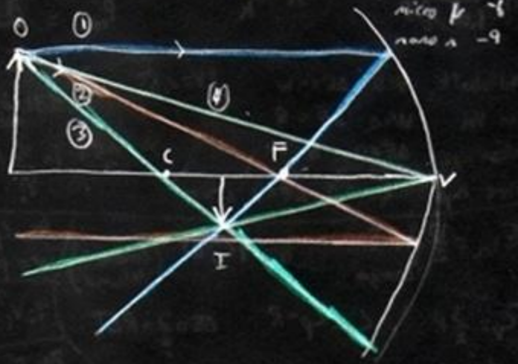
F - pos if on same side of outgoing light

$\frac{1}{p}+\frac{1}{i}=\frac{1}{f}$ spherical mirror

$f=\frac{\text{radius of curvature}}{2}$

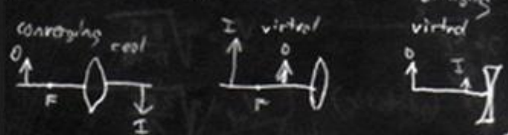
$|m|=\frac{h'}{h}$ $m=-\frac{i}{p}$

pos m = same orientation

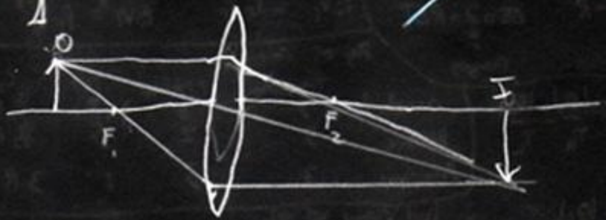


$\frac{1}{f}=(n-1)\left(\frac{1}{r_1}-\frac{1}{r_2}\right)$ r_1 is near object

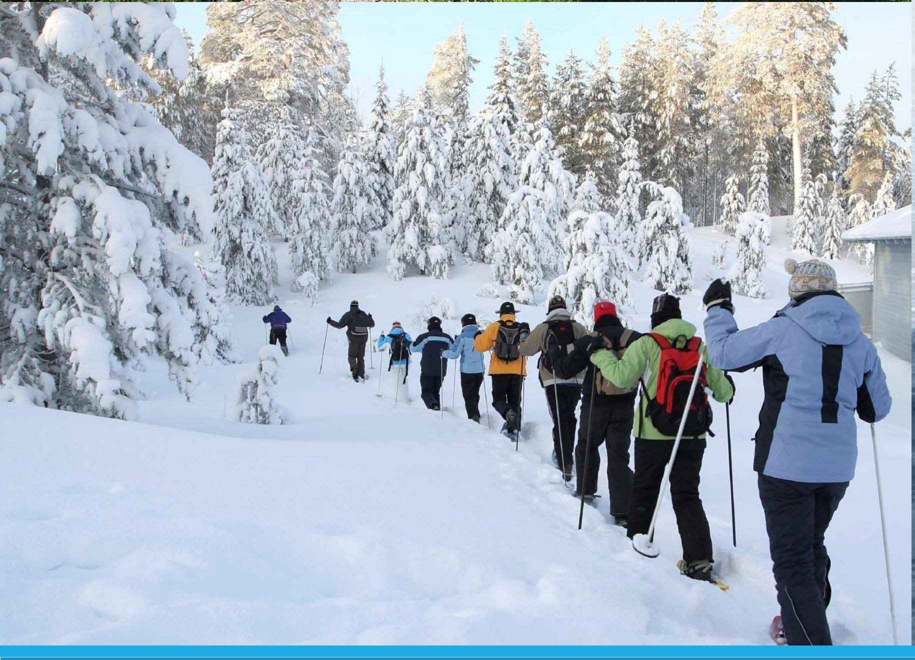
$M=m_1\cdot m_2$

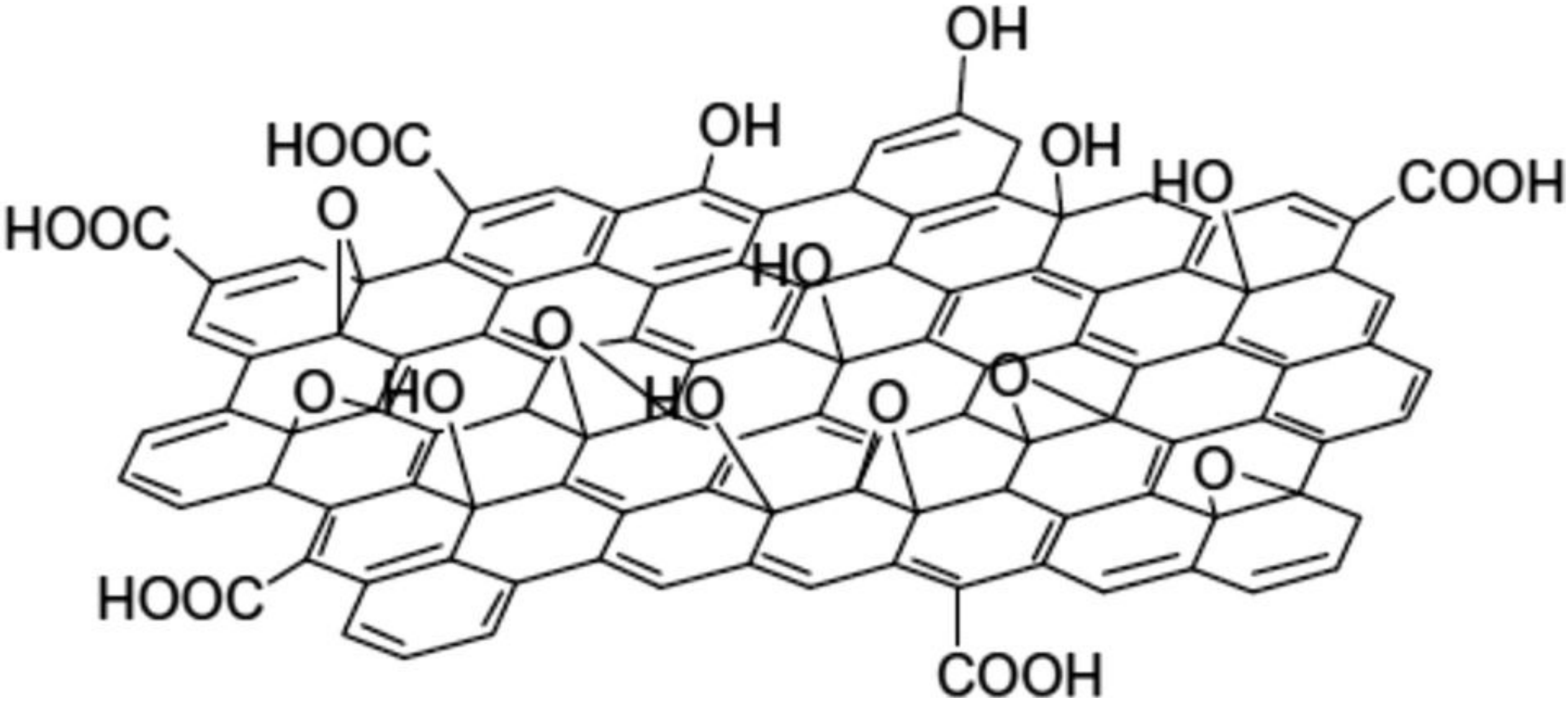


$m_\theta=\frac{25cm}{f}$






OH
HOOC
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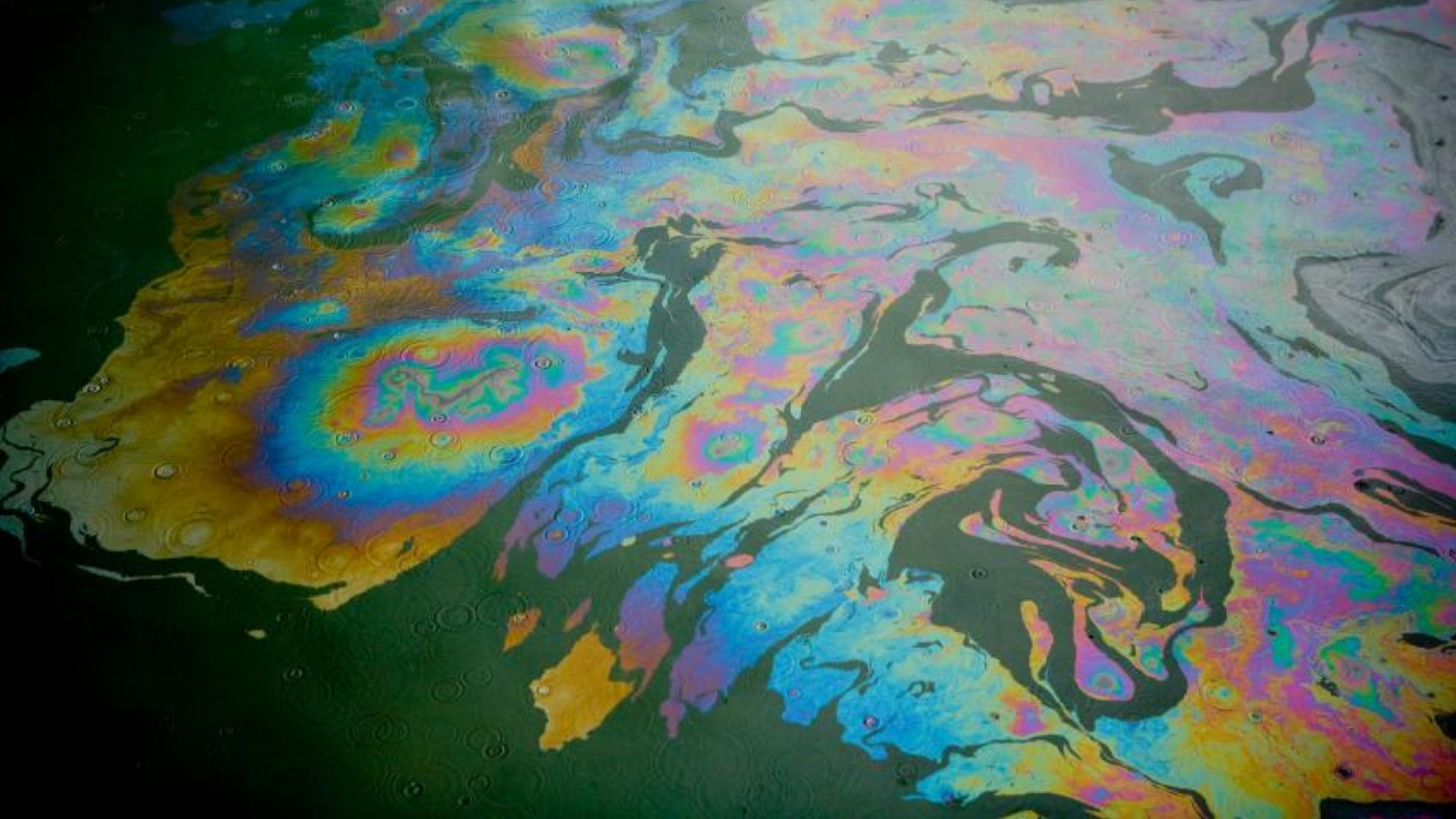
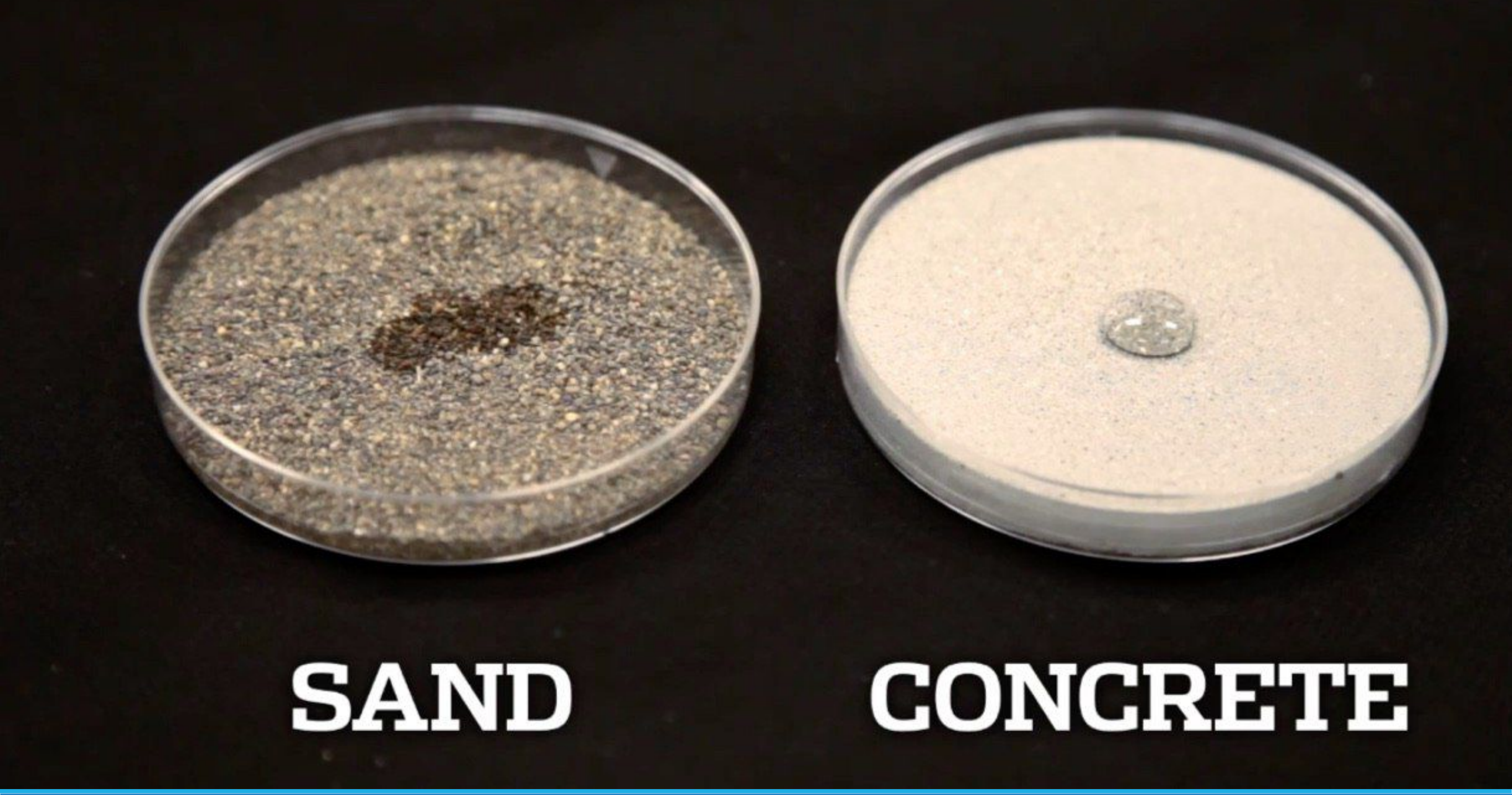
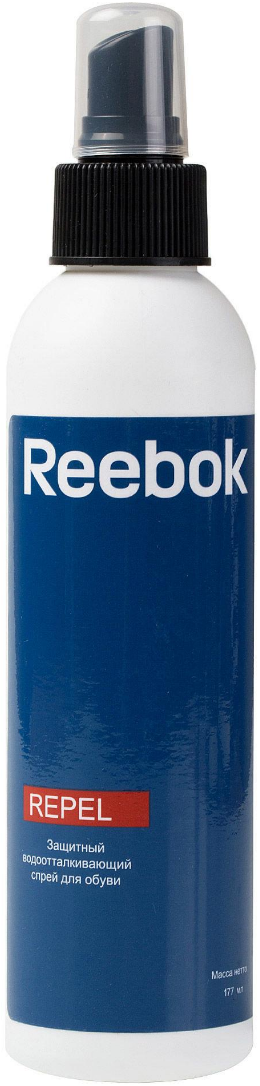



MOUNTAIN
HARD
WEAR


F8
22


SAND
CONCRETE


Reebok
REPEL
Защитный
водоотталкивающий
спрей для обуви


TUORMAT
NANO
WATER–PROOFER
TUORMAT
NANO
WATER–PROOFER


RAPIDO 3
HIGH PEAK


МАЙСКИЙ
МЯСО С ЗЕЛЕНЫМ ГОРОШКОМ И МОРКОВЬЮ
ИКРА ИЗ ОВОЩЕЙ
САЛФЕТКА ДЕЗИНФИЦИРУЮЩАЯ
САЛФЕТКА ДЕЗИНФИЦИРУЮЩАЯ
ПОВИДЛО ЯБЛОЧНОЕ
САХАР ПЕСОК SUGAR
20г
СОЛЬ SALT
5г
ПОВИДЛО ЯБЛОЧНОЕ
ООО «Барышский мясокомбинат»
ГОВЯДИНА ТУШЕНАЯ
КОНСЕРВЫ МЯСНЫЕ
Масса нетто 250 г
Консервы мясорастительные
КАША СЛАВЯНСКАЯ С ГОВЯДИНОЙ

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